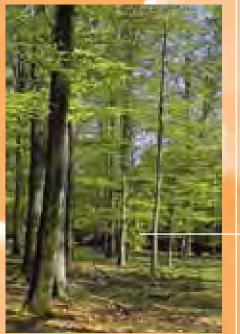
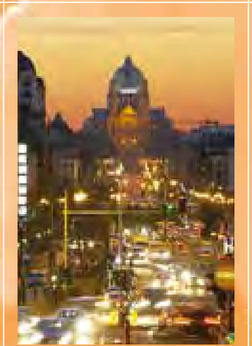
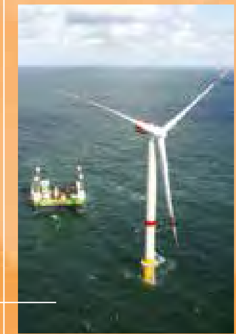


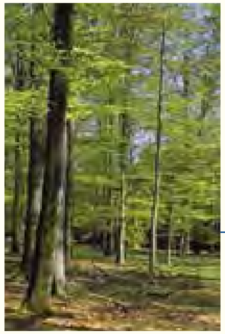


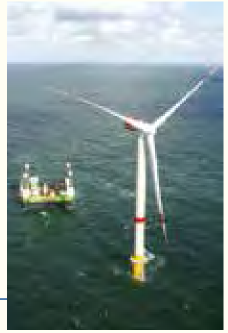


2013

BELGIUM'S SIXTH NATIONAL COMMUNICATION ON
CLIMATE CHANGE

Under the United Nations Framework Convention on Climate Change





2013

BELGIUM'S SIXTH NATIONAL COMMUNICATION ON

CLIMATE CHANGE

Under the United Nations Framework Convention on Climate Change

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1. Executive summary

National circumstances relevant to greenhouse gas emissions and removals

Geography & Climate

Belgium has a relatively limited territory with moderate elevation levels. It is crisscrossed by an important network of waterways and a very dense communications network (roads and railways). The country has one maritime border, the North Sea. Belgium is highly urbanised and densely populated. The population growth rate is low and primarily the result of immigration. Belgium has a temperate climate, characterised by moderate temperatures, predominantly westerly winds, cloudy skies and frequent rains. The evolution of temperatures in the past century reveals an upward trend, a phenomenon that has been accentuated in recent years. Flora and fauna in Belgium are typical of other areas of Europe with a temperate climate. Presently, only 22.8% of Belgian territory is still covered in woodland (forests of broad-leaved trees or conifers). This surface area has retreated slightly since 1990, as has agricultural land, which nevertheless still occupies the greater part of the territory.

Institutions

Belgium is a federal state, composed of three language-based communities and three regions, each with its own executive and legislative bodies. Given the complexity of the structure of the country's institutions and of the division of powers between the different levels of power, the implementation of climate policy is decentralised. Cooperation bodies provide coordination and integration of the policies conducted by the different authorities, and ensure the consistency of national climate policy. The National Climate Commission is charged with drawing up and monitoring the National Climate Plan.

Economy

Belgium has a very open economy, situated at the heart of a zone of intense economic activity. Exports of goods and services accounted for 84.8% of GDP in 2012 and imports 83.6%. The Belgian economy is currently dominated by the services sector. GDP at current prices in 2012 amounted to EUR 376 229 billion. Like neighbouring countries, Belgium felt the impact of the euro crisis in 2012. A timid recovery is expected in 2013.

Energy

Primary energy intensity has declined on the whole in Belgium since 1990, reflecting the uncoupling of economic growth and primary energy consumption. Buildings constitute the leading end consumer of primary energy (33.7%), followed by industry (30.9%) and transport (20.7%). Total final energy consumption decreased at a yearly rate of 0.06% between 2000 and 2011. Petroleum remains the dominant energy (45.3% in 2011) at end consumer level, followed by gas (28.3%), electricity (15.6%), renewable fuels (7.5%), solid fuels (1.7%) and heat (1.7%). Petroleum covers primarily the needs of the transport and residential sectors as well as non-energy uses (feedstocks). Electricity and natural gas, on the other hand, play a major role in industry and the residential sector, while the use of solid fuels is mainly confined to the iron and steel industry.

Electricity generation rose at an annual average of 0.7% from 2000 to 2011. Nuclear plants generate 53.5% of electricity and classic thermal power stations 34.5%; the remaining 12% is generated by pumped-storage power stations, hydraulic energy, wind energy and renewable/recovery fuels. The share of liquid fuels in electricity generation has been declining for a number of years (from 52.7% in 1971 to 0.1% in 2011). Electricity consumption by the residential and tertiary sectors (51.5%) has surpassed consumption by the industrial sector (46.5%). The share of renewable energy has progressed significantly over the last decade, reaching 7.9% in 2011. For the longer term, renewable energy is expected to make up a very significant share of primary energy production in Belgium.

Transport

Transport is a constantly growing sector given Belgium's situation as a country of transit, with an economy geared largely to export. This growth particularly concerns road and air transport. The number of passenger cars has risen spectacularly (motorisation rate in Belgium: one car for every two inhabitants). Growth is even higher for goods transport vehicles. Demand for fossil fuels in the sector is expected to continue to rise. The development of new technologies to improve vehicle energy efficiency is taking a long time to produce an impact on emissions in the sector. In 2011, road is by far the main mode of transport in Belgium, both for passengers (78.3% in private vehicles compared with 6.1% in public transport) and goods (74% by truck).

Industry

Industry in Belgium has changed profoundly since 1960 and its weight in the economy has declined. The metallurgy sector, constituted mainly of large companies situated in the heart of the former industrial areas of Wallonia, has undergone considerable restructuring as a result of the crisis that began in the sector in the 1970s. The textile sector, which also had to cope with major difficulties during the same period, has tended to merge its activities. In contrast, the agri-foods industry has evolved into Belgium's third largest industrial sector and above all has shown the greatest resilience to the crisis. Chemicals account for more than one fifth of the turnover of Belgian industries; Belgium ranks tenth worldwide in this sector. The automotive industry in Belgium is limited to assembly, which takes place mostly in large plants owned by multinationals. Railway construction and the highly technological aviation sector also have a strong presence in Belgium.

Waste

Between 2006 and 2010, waste production increased by 6%. There has been remarkable progress in the recycling of packaging. In 2010, the rates of recycling and recovery of industrial packaging were 81.6% and 90% respectively, while for packaging in the household sector the rates were 83.2% and 94.5% respectively.

Housing

Belgian housing stock is characterised by a high proportion of old buildings. In 2010 81.7% of Belgian housing had central heating. Natural gas has now totally surpassed fuel oil as the main source of heat (57.0% compared with 30.8%). Coal has also shown a marked decline (0.7% in 2010). The housing equipment rate of appliances using energy continues to rise.

Agriculture

Belgian agriculture is specialised in market-garden and horticultural crops, cereals, potatoes, sugar beets, livestock and milk production. Fishing has relatively limited importance in the economy. Although agricultural land in use has remained relatively stable, the number of farms and the active population in this sector have continued to decline significantly in recent years, continuing a trend under way since the Second World War. The active population in agriculture and fisheries currently represents barely 1% of the population. In spite of this decline, agriculture and fisheries are still important economic sectors. Organic agriculture is developing rapidly.

Greenhouse gas inventory information

In Belgium, greenhouse gas emissions were 17.4% lower in 2011 in comparison to the reference year. However, this favourable trend masks contrasting tendencies among the various sectors.

On the one hand, emissions caused by road transport have been increasing continually since 1990 on account of the rising number of cars and traffic that has become more intense. Traffic growth, however, has slackened significantly in recent years.

Emissions from the residential and tertiary sectors fell in 2011 compared to recent years although a number of indicators are rising such as the increase in dwellings and a greater number of employees in the tertiary and institutional sectors. This is due to an exceptionally mild year that had a considerable impact on the global trend for emissions in Belgium. This said, the trend for the tertiary sector since 1990 continues to be a net increase in emissions.

On the other hand, the switch from solid fuel to gaseous fuels is observed in the electricity production sector and industry. This, together with the development of biomass fuels in some sectors, has resulted in a lower CO_2 emission factor for a given level of energy consumption. A more rational use of energy is also developing but it often goes together with greater use of electricity, so its impact on actual emissions is generally harder to quantify. Finally, the closure of certain iron and steelworks over the past few years has also helped to cut emissions. This industrial development is likely to continue.

In agriculture, CH_4 and N_2O emissions are going down, reflecting a drop in the livestock population and certain changes in agricultural practices. In solid waste disposal, biogas recovery and use led to in a net reduction of CH_4 emissions.

Policies and measures

In the Belgian federal system, policies and measures aimed at reducing greenhouse gas emissions are developed at different tiers of governance, according to the distribution of competences between the Federal Government and the regions. Various coordination bodies have been set up to harmonise the policies pursued by the Federal Government and the three regions, ensuring that they complement each other. The National Climate Commission is one such body, and is responsible for developing and implementing climate policy.

As a member of the European Union, Belgium contributes to the EU's commitments under the Kyoto Protocol: an 8% reduction in global greenhouse gas emissions between 1990 and 2008-2012, a reduction set to increase to 20% under an extension of this Protocol up to 2020. In addition, as part of its "climate and energy package", the European Union has set itself the targets of reducing greenhouse gas emissions by 20% between 1990 and 2020, sourcing 20% of its final energy consumption (10% of consumption in the transport sector) from renewable energy by 2020, and achieving a 20% improvement in its energy efficiency (compared to a baseline scenario). The target for greenhouse gas emissions is itself divided between the sectors participating in emissions trading (the ETS system, which covers a large part of industry and energy production/conversion) and other so-called "non-ETS" sectors. Belgium must therefore reduce its (non-ETS) emissions by 15% between 2005 and 2020, and source 13% of its final energy consumption from renewable energy by 2020.

To work towards its first Kyoto target, Belgium has shared the burden between its 3 regions and the Federal Government, each establishing its own emissions reduction policy according to its individual competences. The result of consolidating these various policies is the National Climate Plan, applied between 2009 and 2012 and now almost complete. Since 2013, the National Climate Commission has been engaged in extending this Plan up to 2020, and the regional authorities are in the process of defining their own policies. However, the burden sharing resulting from Belgium's contribution to the European climate and energy package is not yet finalised.[1]

The climate policies of the different Belgian authorities focus on six sectoral strategic priorities: optimising energy production, the rational use of energy in buildings, making an impact on industrial processes, developing sustainable modes of transport, fostering the sustainable management of agricultural and forest ecosystems and strengthening efforts in waste management. There are also complementary, crosscutting priorities such as support for R&D, awareness raising and training of the various target groups, strengthening the government's role in setting an example, implementing flexibility mechanisms and incorporating climate matters into development aid policy.

Energy

The two main climate policy tools in the electricity generation and energy conversion sectors are:

– Firstly, application of the ETS system aimed at reducing greenhouse gas emissions
– Secondly, the green certificate (as well as "cogeneration" certificates in the Flemish Region) to promote electricity generation using renewable energy sources and high-efficiency cogeneration. These are supplemented by financial support (subsidies, grants and tax relief) for investment in these generation facilities.

[1] Situation as at autumn 2013.

Buildings

Measures to promote rational energy use and the use of renewable energy sources in buildings focus on transposing the European Directives concerning energy performance of buildings and improving energy efficiency. These tools provide a timetable for the entry into force of increasingly stringent energy standards for new constructions and substantial renovations, including heating and hot water production facilities and financial support for upgrading the energy efficiency of existing buildings.

Mandatory preparation of an energy certificate for any building prior to a transaction (sale, rental) should offer, in the medium and long term, a way of attributing added value to the most efficient buildings.

Use of a third-party investor is the solution chosen by the Federal Government to improve its own building stock.

Industry

In industry, the ETS system is a major tool for reducing greenhouse gas emissions in the most economically favourable way possible. A second crucial tool is the sectoral agreements drawn up between the regional governments and their industries concerning targets for improving their energy efficiency and reducing their greenhouse gas emissions. These agreements pave the way for opportunities to use renewable energy sources and develop "CO_2 mapping" of the activity of industrial sites or commodity chains.

Transport

In the transport sector, the initiatives undertaken by the federal and regional governments mainly focus on:

- Limiting road traffic growth and incentivising the "modal shift" (towards rail or waterways): improving public transport provision, promoting car-sharing, upgrading infrastructure.
- Encouraging drivers to acquire and use low-energy vehicles (information, tax incentives) and use them in moderation (eco-driving).

Agriculture and Forestry

Initiatives in the agricultural sector primarily focus on reducing greenhouse gas emissions, decreasing production (manure spreading standards, limiting the amount of livestock) and improving agricultural practices (processing, storage and spreading of manure, waste recovery, combating soil degradation, etc.). Reforestation and forest conservation are encouraged through specific legislation.

Waste

The policies implemented to reduce the volume of waste and optimise its treatment are based on environmental taxation (promoting reusable packaging), stricter regulations (ban on landfill, mandatory treatment of landfill gases, standards for incinerators) and the development of specific channels for waste recovery and treatment.

Projections and the total effect of policies and measures

The 'with measures' scenario indicates the likely evolution of greenhouse gas emissions in Belgium under current policies and measures. This scenario includes all policies and measures adopted at the end of 2012 by the federal and regional governments, aiming at reducing greenhouse gas emissions. Under these policies ('with existing measures' scenario), greenhouse gas emissions in Belgium (excluding LULUCF) are expected to decrease from **131.6 Mtonnes CO_2-eq** in 2010 to **122.0 Mtonnes CO_2-eq** in 2015 and to **120.6 Mtonnes CO_2-eq** in 2020. Main factors explaining the significant decrease after 2010 are the assumed moderate decrease in manufacturing industries up to 2020, a decrease in industrial processes and a steep decrease in electricity generation. The current additional measures represent an estimated total additional reduction of about 1.9 Mtonnes CO_2-eq in 2020. The Belgian federal and regional governments are in the process of defining measures to meet the renewable energy and non-ETS objectives for 2020 of the European Energy Climate Package.

Uncertainties regarding exogenous variables such as economic growth, climate conditions, and electricity imports exist and their level influences the resulting greenhouse gas emissions, in particular in the sectors covered by the EU ETS.

The emissions from the 2008-2011 inventory period, together with the first indications for 2012, suggest that greenhouse gas emissions in Belgium in the Kyoto period 2008-2012 will be below the Kyoto target.

A greenhouse gas emission limit of -20% in 2020 compared to 1990 greenhouse gas emissions levels has been fixed for Belgium in Decision 1/CMP8. However, this target will be subject to a burden-sharing between EU member States, under Article 4 of the Kyoto Protocol. Hence, it seems too early to comment on the projected emissions in 2020.

Within the internal EU policy,[2] the Belgian targets are -21% for the ETS sector and -15% for the non ETS sector. Taking into account the expected effect of the adjustments pursuant to Article 10 of the Effort Sharing Decision, this results in an emission reduction objective of 66.7 Mt CO_2-eq. for the non-ETS sectors in Belgium. The current projected emissions for the non-ETS sector are 75.7 Mt CO_2-eq.,

[2] Effort-Sharing Decision EC 406/2009 and other legislative acts.

so existing and currently envisaged additional measures would not be sufficient to reach the non-ETS target in 2020. However, the internal Belgian burden sharing of the ESD targets has not been adopted yet, so no final conclusions can be drawn for the time being from a regional nor a national point of view.

Vulnerability assessment, climate change impacts and adaptation measures

Climate change will have an impact on our everyday life worldwide, and therefore in Belgium too. Research has already been carried out on this subject in various sectors (water management, coastal management, biodiversity, agriculture, forestry, fisheries, infrastructure, transport, industry and services, energy, tourism, health, and development cooperation) and measures have been taken. These are the first steps at any rate in a long, profound process.

Spurred on by the developments at European level (the European adaptation strategy, the ‘Climate Adapt’ exchange platform, etc.), Belgium too has made significant progress in terms of adaptation policy. For instance, in 2010 the national adaptation strategy was adopted and action plans were drawn up and adopted at regional and federal levels.

Regional studies have developed regional climate projections. These projections have provided more information on the vulnerability of the sectors to future climate situations. Cross-cutting focus groups have been established and research programmes launched to improve the understanding of the effects of climate change and adaptation. In this respect, the value of certain exploratory projects must also not be underestimated. Good examples include the Interreg project ‘Future cities’, the MODIRISK programme which takes stock of exotic and endemic species of mosquitoes, the experience in Cities-Adapt of the City of Gent and more sector-related projects in agriculture, forestry and fisheries, for example.

In various (existing) plans and programmes, account has already been taken of climate change, such as in spatial planning (CcASPAR), a marine spatial plan, water purification management plans and studies (‘AMICE’ project), rural development and agricultural technical advice/opinions (GISER unit), transport plan in Brussels, and the winter/summer plan of the railways, Master Plan for Coastal Safety and Sigma Plan, National Environmental Health Action Plan (NEHAP).

The information and awareness-raising of the Belgian population, as occurs in the case of water or heat wave campaigns, constitute an important aspect.

New or innovative processes may be very diverse. The Flemish new industrial policy seeks for answers to the new challenges. In the energy sector too, there is a search for stability and certainty under the changing climate.

Not only costs, but also benefits are to be expected. Warm summers could make the Belgian coast more attractive to tourists and climate change may give Belgium the edge over competing regions.

Legislation on adaptation is still rare and it is highly likely that it will seldom be introduced. Some exceptions, however, are measures to make cities cooler with green roofs or building regulations in flood plains.

In the context of development cooperation, a university research platform has been set up (‘Klimos’) to provide policy support concerning climate change. This includes the development of an ‘Environmental Sustainability Tool Kit’. In addition to various bilateral programmes and multilateral organisations which devote themselves to climate adaptation, Belgium supports international scientific research into climate adaptation and agriculture, notably via the ‘Consultative Group on International Agricultural Research’ (CGIAR).

Financial resources and technology transfer

This chapter summarises the Belgian efforts to integrate the fight against climate change in development cooperation. The financial resources being reported on were made available from 2008 to 2012 by the Federal Government, regions and communities.

The total official Belgian development assistance in this period amounted to almost EUR 8 billion[3].

The data for calculating the expenditure on climate change in the Sixth Communication to UNFCCC comes from the ODA databank of the Directorate-General for Development Cooperation (DGD). A sectoral analysis was carried out, in which the following sectors were dealt with in their entirety: environmental protection, water supply and waste water treatment, agriculture and cattle breeding, forestry, energy and fishing/aquaculture. The same calculation method was used for the 5th National

[3] The figures for 2012 were still incomplete at the time of drafting the report.

Communication, which makes it possible to establish trends among the different reporting periods. Other sectors were partially included: humanitarian aid (subsectors: coordination, prevention and reconstruction), industry (subsectors: administration, research, agricultural industry and timber industry), transport (water transport) and multi-sectoral (subsectors: general, alternative development, research, urban development, training and rural development). A weighting factor was applied to each subsector in order to estimate the extent to which it focuses on the climate.

From 2010, the share of climate-related ODA in the selected sectors rose significantly and then remained stable at around 25% of the total ODA granted in those sectors.

In spite of challenging budgetary conditions, Belgium made efforts in this period to contribute towards the fast-start financing as agreed during the UNFCCC COPs in Copenhagen and Cancun. Additional funds, totalling EUR 88 million, were provided over and above the planned measures each time for fast-start financing in 2010, 2011 and 2012.

The DGD, like the federal entities, has always included the aspects of technology transfer and capacity building in its bilateral agreements. The transfer of environmentally friendly technology must enable the rapid growth of developing countries while simultaneously protecting the environment and natural resources. Capacity building has the same aim and must enable individual countries to quickly comply with the requirements of various international agreements, national plans, technological evolution, etc. Most field activities at the level of capacity building and technology transfer are managed by multilateral and indirect players. Even though it is difficult to make a precise estimate of the share of programmes and projects that relate to climate change, a number of examples of interventions with a clear technology transfer component are appended to chapter 7.

The research projects of Belgian universities and scientific institutions also deserve a mention in this regard. One example is the KLIMOS research platform – an alliance among various Flemish universities and colleges – that was established in 2010. Various research groups work around the following main themes: energy, food safety and forests. By means of their research, these scientists support Belgian development cooperation in detailing the policy for integrating mitigation and adaptation in development cooperation.

Summary (in EUR)	2009	2010	2011	2012
Adaptation	46 580 798	65 775 345	69 683 424	43 476 874
Mitigation	32 450 553	45 966 100	44 453 700	23 009 164
Total climate-related	79 031 351	111 741 445	114 137 124	66 486 038
Total ODA for the selected sectors	416 405 569	430 284 282	449 239 320	293 317 140
% climate-related ODA	19	26	25	23

Research and systematic observation

Institutionally speaking, Belgium is a type of 'mini-Europe', where each of the federated state authorities (regions and languistic communities) is singularly competent for the areas of science, technology and innovation (STI) granted to it by law. The long decentralisation process which began in the 1970s, has led to a fascinating differenciation of institutions and policies visions adapted to the specific STI potential and the social and economic needs of each parts of Belgium and its different entities (BRISTI, 2010).

The distribution of responsabilities in STI across the various Belgian authorities is based on fields of competences rather than on the actors. Concretely, this means that HEIs may receive funds from the federal, regional or Communities (according to their location and their linguistic regime) but for different purposes and with different conditions attached to the finances received (BRISTI, 2010).

Cooperation, coordination and consultation, which form the basis for the formulation of decisions and positions related to research policy, are organised by the International Cooperation Commission (ICC) and the Federal Cooperation Commission (FCC), two permanent committees of the Interministerial Conference for Science Policy (IMCSP).

Climate-related research is a typical field for international cooperation. This cooperation is related to various activities: research and observation as well as scientific assessment and integration. Belgium is active in all of these efforts.

At the European level, cooperation takes place by means of coordinating instruments, for nationally funded research such as ERA-NETs (European networks of research funders and managers), COST (an intergovernmental framework for European cooperation in the field of research), ESFRI (European Strategic Forum on Research Infrastructures) and JPIs (Joint Programming Initiatives, for instance, JPI FACCE, Urban Europe).

The first call resulted in a joint project with Burundi on the exploitation of observations for climate applications and improving research within the framework of the cooperation instrument 'Networking with Federal Scientific Institutions (FSIs)', an instrument for the FSIs to exchange knowledge, ideas, experiences and researchers with third countries.

The department of Economy, Science and Innovation of the Flemish Government (EWI) is together with the Agency for Innovation by Science and Technology (IWT), the Research Foundation – Flanders (FWO) and the Hercules Foundation (financing of infrastructure) involved in several research programmes and networks on climate-related issues, such as ERA-NETs (Eco-innovera, Transport 'future travelling', etc.), the Joint Technology Initiative Fuel Cell and Hydrogen (FCH), ESFRI, JPIs, KICs (Knowledge and Innovation Communities),… Additionally, the Flemish Environment Agency (VMM) actively participates in a number of Interreg projects.

Flanders together with VITO (Flemish Institute for Technological Research), is a member of the BERA (Belgian Energy Research Alliance) and is involved in various EERA Joint Programmes. In addition to this, Flanders is significantly enrolled in the Strategic Energy Technology Plan (SET Plan), which is a pioneer in terms of an efficiently coordinated approach for all European countries in the field of energy technology.

To encourage the participation of Brussels-based players in various European or international research programmes, the Brussels Institute for Research and Innovation (INNOVIRIS) makes grants available to SMEs, universities and research bodies wishing to implement an "International Partnerships" project. Through this initiative, INNOVIRIS is funding the preparation, negotiation and submission of R&D projects involving one or more participants from Brussels with one or more foreign entities in the context of European R&D programmes.

In addition, the Brussels Enterprise Agency (BEA) provides free assistance to stakeholders in the region (enterprises, associations, universities or research centres) interested in obtaining European funding for research and innovation. It gives special attention to technology thematic areas that are a priority for the region (including the environment, energy and sustainable construction).

The majority of climate research conducted by the Federal Government is integrated within the framework of the programme Science for Sustainable Development (SSD) Programme (2005 to 2009-extended) and Belgian Research Action through Interdisciplinary Networks (BRAIN-BE). This framework programme allows through the funding of research projects based on scientific excellence and European and international anchorage to meet the needs for scientific knowledge of the federal departments and to support the scientific potential of the Federal Scientific Institutions. The selection of projects is based on calls and evaluations.

There are also a number of current climate-relevant projects within the framework of the STEREO II (Earth observation by satellite) research programme.

One of the issues addressed by the administrative agreement recently drawn up between the Chairman of the Federal Science Policy Office and the Minister responsible at the time is the development of a reference centre in the field of climate expertise within the federal scientific institutions.

A newly setup expertise platform on climate scenarios will direct the development of coherent climate scenarios and develop a 'forward looking approach' as regards the scenario and model development needs in the future. This important development prepares the way for the development of a more service-oriented environment.

In Wallonia, science, technology and innovation are managed by several directorates general of the Walloon Public Service (SPW). The Walloon Region primarily finances research, development and innovation activities with a view to developing economic and industrial activity, as well as research aimed at developing specific expertise in its areas of competence. The Walloon budget for energy-related research and development currently stands at around 30 million EUR a year. According to the IEA classification, the average main research areas are energy conservation (46%) and renewable energy (28%), followed by electricity generation and storage technologies (12%).

Wallonia also participates in numerous climate projects such as carbon capture by ecosystems, recycling of CO_2 contained in waste and value creation from biomass (SCOT, ERA-net, various ERDF projects, ICOS, etc.). In the Wallonia-Brussels Federation, the administration in charge of developing and implementing scientific policy is the Directorate for Scientific Research. The responsibilities of this administration include the financing of universities and higher education institutes that promote basic research (FRS-FNRS), development of concerted research actions (ARCs) and training in industrial and agricultural research (FRIA). In practice, the

Fund for Scientific Research (FRS-FNRS) is the lead financing and management body.

Most climate research in Flanders takes place in universities and research institutes. In addition to this, various Flemish research centres conduct climate research: the Flemish Information Centre for Agriculture and Horticulture (VILT) for agriculture, the Institute for Nature and Forest Research (INBO) for forestry, and the Institute for Agricultural and Fisheries Research (ILVO) for fisheries and agriculture. The study by VITO (Flemish Institute for Technological Research) concentrates on innovative technology that supports the transition to a more sustainable industry.

Although the Flemish science and innovation policy is based on a bottom-up approach, there are also thematic priorities defined by the Government. Through the future project ‘Flanders in Action’, six multidisciplinary innovation hubs have been identified adressing major societal challenges. Three of these are connected to tackling climate issues, namely eco-innovation, green energy, and sustainable mobility and logistics.

The current scientific research strategy in Brussels is grounded in the Regional Plan for Innovation 2007-2013 (PRI). The environment is one of the three pillars on which the Brussels-Capital Region has decided to develop excellence in research. In terms of specific actions, the region has decided to strengthen technological potential from academia and support for research and development by enterprises. INNOVIRIS supports research on environmentally friendly and sustainable development through various financing programmes. Other administrations, such as IBGE/BIM (Brussels Environment) and the Administration of Equipment and Transport (AED Brussels Mobility), finance isolated studies directed primarily at developing and assessing their policies. The Brussels Enterprise Agency (BEA) helps companies evaluate, start up and develop projects of an innovative nature or those with a technological component.

The “Observation” section of this chapter is a short version of the GCOS report requested by the UNFCCC, providing additional information on national and worldwide observation activities relevant to global change. It covers both national and foreign ground-based observations and ongoing satellite observations.

Education, training and public awareness

The Belgian population still pays a great deal of attention to the issue of climate change, but the topic comes up less frequently in public debates or in the press than a few years ago.

This finding is confirmed by the results of the latest Eurobarometer survey, conducted in May 2013. According to this survey, in which over 1000 Belgians took part, environment, climate and energy-related issues in our country are clearly considered to be far less important compared to 2009, the year in which the Fifth National Communication was drawn up.

In the period 2010-2013, a number of awareness-raising campaigns were again launched for the environment in general and global warming in particular at the various political levels in the country (federal, regional and municipal).

However, in the field of awareness-raising with respect to energy-saving, there nevertheless seems to be a gradual shift under way from general campaigns to more solution-oriented activities, dovetailed to the target groups and in the form of more specific provision of advice, personal guidance, calls for projects, etc. This is evident from the many activities focusing on buildings (insulation, the use of solar energy, etc.) or mobility.

Children and adolescents (increasingly) form a priority target group: there is a broad range of educational material and activities for the various age groups. Environmental education has gained a firm foothold in the Belgian education system and is increasingly linked to a whole series of awareness-raising initiatives outside the school environment. The education-linked activities in connection with sustainable development, both inside and outside the school, are carried out by a growing number of actors, thanks to public funding.

In higher education, the interest in climate change is increasing further: courses have been developed on the subject and specific subdivisions on environmental issues, climate change, glaciology, climatological architecture, etc. are being introduced.

This chapter finally also mentions the efforts made for training in southern countries and provides an overview of the main websites available to the public.

2. National circumstances relevant to greenhouse gas emissions and removals

The preparation of this chapter was coordinated by:

Laurence de Clock

Federal Public Service Health, Food Chain Safety and Environment

DG Environment – Climate Change Section

A brief overview of Belgium [1] [2]

Population (on 1 January 2012):	11 035 948 inhabitants
Surface area:	30 528 km²
Federal capital:	Brussels
Head of State:	HM King Philippe
Prime Minister:	Elio Di Rupo
National languages:	Dutch, French and German
Currency:	Euro
GDP 2012 (current prices):[6]	376 229 billion EUR
GDP growth rate (volume, variation from previous year):	1.9%
Active population (2012):	4 847 422
Gross added value per branch of economic activity 2012 (estimates at current prices) [6] Agriculture Industry Construction Services	 2 798 million EUR 55 499 million EUR 19 150 million EUR 258 310 million EUR
Population density (on 1 January 2011):	364 inhabitants per km²
Highest point:	Signal de Botrange (694 m)
Average temperature (Uccle, 2000-2012):	11.0º Celsius
Precipitation (Uccle, 2000-2012):	877 mm
Hours of sunshine (Uccle, 2000-2012):	1 544 hours

2.1. Institutional structure

2.1.1. Federal structure of the state

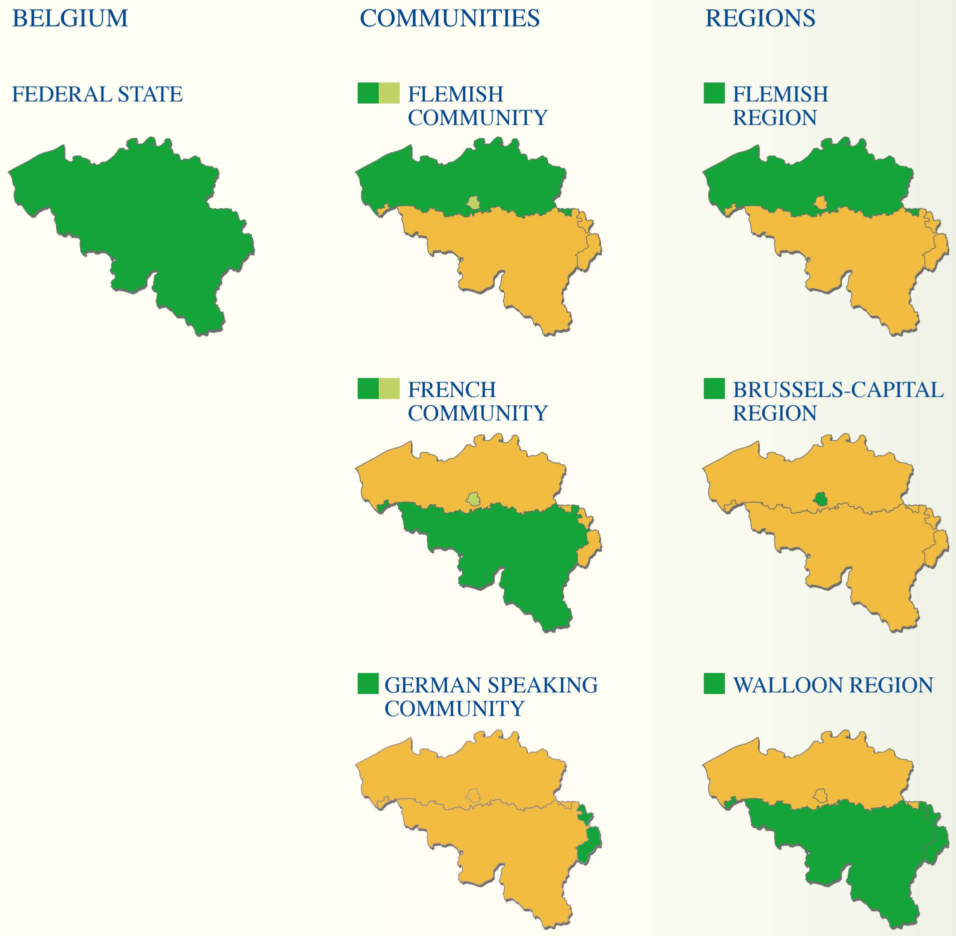
Belgium is a federal state composed of communities and regions.[4] After becoming independent in 1830, Belgium gradually evolved from a unitary to a federal structure. Six successive constitutional reforms (in 1970, 1980, 1988-89, 1993 and 2011) have resulted in the present-day governing structure [3]. The sixth constitutional reform (institutional agreement of 11/10/2011) is currently being implemented. The draft special act transferring certain powers has been submitted to parliament for adoption. The division of powers under the successive reforms evolved on the basis of two main criteria. The first is language, and more broadly, culture, which gave rise to the communities. The concept of 'community' refers to the people that make it up and the ties that unite them, namely language and culture. Belgium has three official languages: French, Dutch and German. Modern-day Belgium is therefore composed of three Communities: the Flemish Community, the French Community and the German-speaking Community, which correspond to population groupings. The French Community exercises its authority in the Walloon provinces with the exception of the German-speaking municipalities, and in Brussels; the Flemish Community exercises its authority in the Flemish provinces and in Brussels; the German-speaking Community exercises its authority in the municipalities of the German-speaking region, all of which are situated in the Province of Liege (figure 2.1).

The second main thrust of the constitutional reform is rooted in history and in particular the aspiration of some for greater economic autonomy. The creation of three regions is the result of these aspirations. The three regional institutions are named after their territories, i.e. from north to south, the Flemish Region, the Brussels-Capital Region and the Walloon Region (figure 2.1). Their powers have expanded during the different phases of the reform. Currently, each of the three regions has legislative and executive bodies: the regional council and the regional government. In Flanders, the community and regional institutions have merged, so there is only one Flemish council and one Flemish government.

The constitutional reform has thus created a three-tier system. The upper tier comprises the federal state, the communities and the regions, all equal under law (note that the sixth constitutional reform has now moved the country's centre of gravity from the federal state towards the regions and communities). They intervene on an equal footing but in different areas.

4 First article of the Belgian Constitution

Figure 2.1 Belgium, a federal state



Source: FPS Chancellery of the Prime Minister

The middle tier comprises the 10 provinces. They act within the framework of the federal, community or regional powers and are subordinate to all higher authorities.

The bottom tier of the edifice comprises the municipalities (589 in all), which are the level of power closest to the citizen. Like the provinces, they too are subordinate to the higher authorities. Depending on the area of power being exercised, they are therefore accountable to the Federal Government, the community or the region. They are financed and controlled primarily by the regions.

2.1.2. Division of powers

The Federal Government is responsible for key policies such as foreign affairs, defence, justice, finance, social security and a considerable part of public health matters and internal affairs. The communities and the regions are nonetheless responsible for establishing foreign relations for matters under their authority.

The powers of the communities concern matters related to 'persons': culture (theatre, libraries, audiovisual, etc.), education, use of languages and matters that can be 'personalised', including health policy (preventive and curative medicine) and assistance to individuals (child protection, social assistance, family assistance, reception of immigrants, etc.). The communities are also responsible for scientific research and international relations in the areas under their authority.

The regions have powers in areas related to occupation of the 'territory' in the broad sense. The Flemish Region, the Brussels-Capital Region and the Walloon Region are thus responsible for the economy, employment, agriculture, water policy, housing, public works, energy, transport (with the exception of the national railway, SNCB/NMBS), the environment, town and country planning, rural revitalisation, nature conservation, credit, foreign trade, and provincial, municipal and intermunicipal administration. They are responsible for scientific research and international relations in the above-mentioned areas.

In the framework of the sixth institutional reform, there are new transfers of competence and increased autonomy for the federated entities. They thus acquire greater competences in the context of family allowances, employment policy, healthcare or caring for older people, in other words around 40% in additional resources. Another major innovation is the fiscal autonomy given to the regions, with a total of 12 billion EUR.

2.1.3. Coordination structures relating to climate policy

The Interministerial Conference for the Environment and the Coordination Committee for International Environment Policy

Given Belgium's federal structure and the division of powers, several structures have been created to promote consultation and cooperation between the different levels of power and to ensure consistency in the action of the federal state and its entities. Sixteen interministerial conferences, each related to a particular policy area, have been created. The interministerial conferences are specialised committees whose members are the ministers concerned from the different governments.

One of these bodies, the Interministerial Conference for the Environment (ICE), is made up of the Federal Minister for the Environment, the Environment Ministers of each of the three regions (Brussels-Capital, Flanders and Wallonia) and the Federal Minister for Science Policy. Depending on the matter being addressed, and given the cross-cutting nature of many environmental issues, this conference can be enlarged to include other ministers concerned. The ICE focuses on matters for which intergovernmental cooperation is required to implement environment policies. It plays a key role in climate policy. The decisions of the ICE are prepared and implemented by different working groups, which are answerable to the Coordination Committee for International Environment Policy (CCIEP), comprised of representatives of the different departments of the Federal and Regional public administrations concerned.

The CCIEP is the main body responsible for coordinating international environment policy, with the exception of matters related to European environment policy, which is the responsibility of the Directorate-General Coordination and European Affairs (DGE) of the Federal Public Service Foreign Affairs, External Trade and Development Cooperation. DGE plays a pivotal role, providing coordination for follow-up of Belgium's European policy, and consulting and collaborating with the partners of the federal and federated entities. It approves Belgium's positions for meetings of the Council of the European Union. The ICE and the CCIEP operate on the principle of consensus, which rules out unilateral decisions.

The principal CCIEP working group dealing with climate policy is the Greenhouse Effect Coordination Group. It is made up of representatives of all the federal and regional administrations and policy units as well as the federal and regional cabinets concerned with Belgian and international climate policy. This group's main task is to participate, through coordination of Belgium's position, in the development of strategy papers, decisions, recommendations, legislation and other European and multilateral regulations on climate change or on policy in the broad sense when climate change is one of the subjects addressed. The Greenhouse Effect Coordination Group also maintains contacts with other relevant Belgian policy and consultation bodies. It organises consultation with stakeholders on the above-mentioned subjects. The Coordination Group secretariat is provided by the Climate Change Department of the Federal DG Environment, which also serves as the National Focal Point for the UNFCCC.

The CCIEP Emissions Working Group is charged with preparing the national inventories of atmospheric pollutant and greenhouse gas emissions, in accordance with European and international reporting obligations. Methodology related to estimating historical emissions, including the harmonisation of the methodologies used by the three regions, is handled by this group, which also contributes to inventories. The CCIEP Emissions Working Group contributes to efforts to implement obligations relating to inventories of atmospheric pollutant and greenhouse gas emissions. Responsibility for the formal approval of Belgium's greenhouse gas inventories specifically falls to the National Climate Commission.

The National Climate Commission

Established by the Cooperation Agreement of 14 November 2002 between the federal state and the three regions, the National Climate Commission was put into place at the end of 2003. It is responsible for a number of tasks related to national implementation of climate policy. Its central responsibilities are implementation and follow-up of the National Climate Plan, follow-up and adaptation of the Plan's policies and measures, collecting and exchanging data and preparing mandatory reports. The National Climate Commission can also advise the CCIEP on international policy on climate change and greenhouse gas emissions. It is made up of four representatives of each of the Contracting Parties, appointed by their governments.

It is assisted by a permanent secretariat and thematic working groups which are mandated by the National Climate Commission to address different issues. Working groups have been set up to work on the following recurring matters:

– PAMs (e.g. monitoring National Climate Plan policies and measures …)
– Projections (e.g. harmonising projections on greenhouse gas emissions made by the federal and regional authorities)
– Flexible mechanisms (e.g.: law approving the cooperation agreement between the federal authority, the Flemish Region, the Walloon Region and the Brussels-Capital Region on the implementation of certain Kyoto Protocol measures, concluded in Brussels on 19 February 2007)
– Register (e.g. 18 June 2008 - cooperation agreement between the federal state, the Flemish Region, the Walloon Region and the Brussels-Capital Region relating to the organisation and administrative management of Belgium's standardised and secure register system in accordance with the European Parliament and Council Directive 2003/87/EC and Decision 280/2004/EC of the European Parliament and Council)
– DNA/FP (coordination of the tasks of the Belgian Designated National Authority (DNA) and Focal Point (FP))
– ETS (effort trading scheme) (e.g. coordinating compulsory annual reports under the ETS directive).
– Other temporary working groups were set up to support the work of the CNC on certain specific files, such as drafting a Strategy and National Adaptation Plan or drafting a cooperation agreement on the national distribution of efforts in the context of the Energy and Climate Package.

Flanders 'Climate Policy' Task Force

The Vlaams Mitigatieplan (VMP, Flemish Mitigation Plan) 2013-2020 was prepared at an official level by the Vlaamse Task Force Mitigatie (VTFM - Flemish Mitigation Task Force) at a meeting chaired by the environment policy field group. The VTFM was responsible for coordinating the VMP and for preparing a monitoring system. The VTFM also facilitated coherence between the policy fields and served as an appropriate forum for the exchange of information in connection with good practice on the basis of its own knowledge, examples abroad and consultation with civil society. The working group consisted of representatives from the environment, energy, mobility and agriculture policy fields. Where necessary, a larger group of representatives was called upon in extra meetings on specific themes. The members of the Task Force, each for their own sector, played a coordinating role in this large group of representatives. After approval of the Vlaams Mitigatieplan the VTFM will coordinate its implementation.

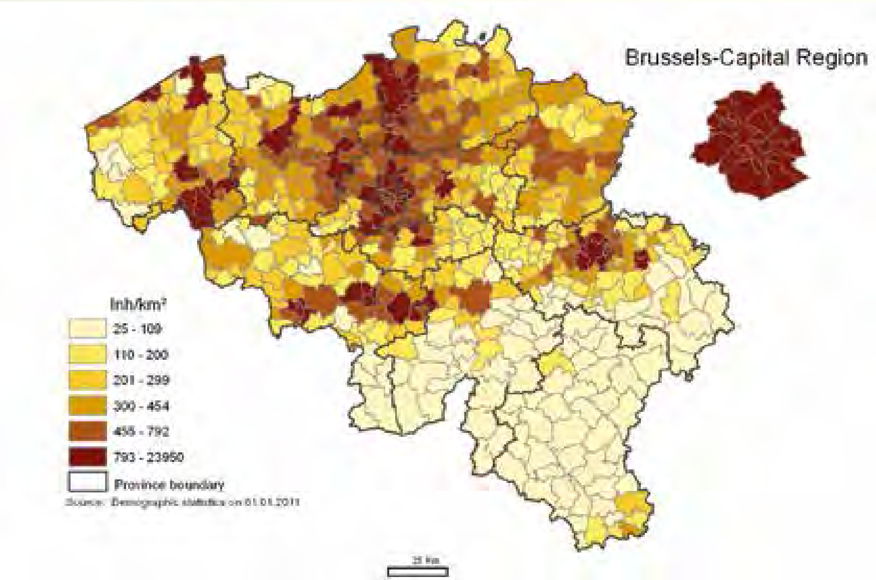
2.2. Population profile

2.2.1. Population distribution

Belgium is presently one of the most densely populated countries in Europe, with an average density of 364.3 inhabitants/km² (on 1st January 2011), which means that it is the third highest in Europe. However, this density varies considerably from one part of the country to another. The highest densities are found in a central triangle formed by Antwerp, Brussels and Ghent. The Brussels-Capital Region has a density of 7131.1 inhabitants/km². High population densities are also found in other areas, particularly in the coastal region and along an axis that passes through Wallonia from Mons to Liege. Inversely, a large part of the south of the country does not exceed 50 inhabitants/km². The province of Luxembourg is the least densely populated (61.9 inhabitants/km²). [1]

Belgium's territory is highly urbanised with 135 cities, the largest of which are Brussels (1 138 854 inhabitants), Antwerp (502 604), Ghent (248 242), Charleroi (203 871) and Liege (195 576). The ten biggest cities make up more to 25% of the population. The major demographic process at work is the redistribution of urban populations in the new suburbs of cities or even in rural regions. Currently, the Flemish Region makes up 57.5% of the population, the Walloon Region 32.1% and the Brussels-Capital Region 10.3% (table 2.1).

Figure 2.2 Population density by municipality on 1st January 2011



Source: FPS Economy - Belgium statistics, Demographics Department

Table 2.1 Population on 1st January 2012 and annual change

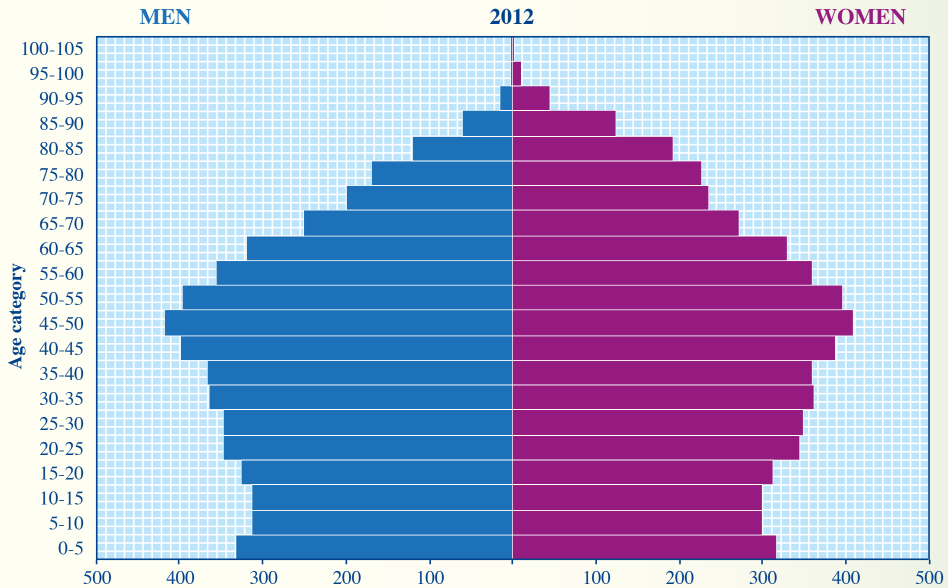
	Population	Annual change (2000-2012)
Belgium	11 035 948	0.63%
Flemish Region	6 350 765	0.56%
Walloon Region	3 546 329	0.50%
Brussels-Capital Region	1 138 854	1.44%

Source: FPS Economy - Belgium statistics, Demographics Department

2.2.2. Growth and composition of the population

The Belgian population is growing yearly at the rate of 0.6% (table 2.1). This growth, which is more sustained in the Brussels Region (1.4%) than in Flanders or Wallonia (0.5%), results in particular from immigration (nearly 10.6% of the population is of foreign origin). The declining birth rate, a decrease in the balance of immigration, marked improvement in medical care and a more selective immigration policy have gradually led to a reduction in natural growth and the ageing of the population (figure 2.3). Foreign nationals, nearly two-thirds of whom are from European Union countries, reside primarily in

Figure 2.3 Structure of the population on 1st January 2012
(by age groups of 5 years and for 1 000 inhabitants)

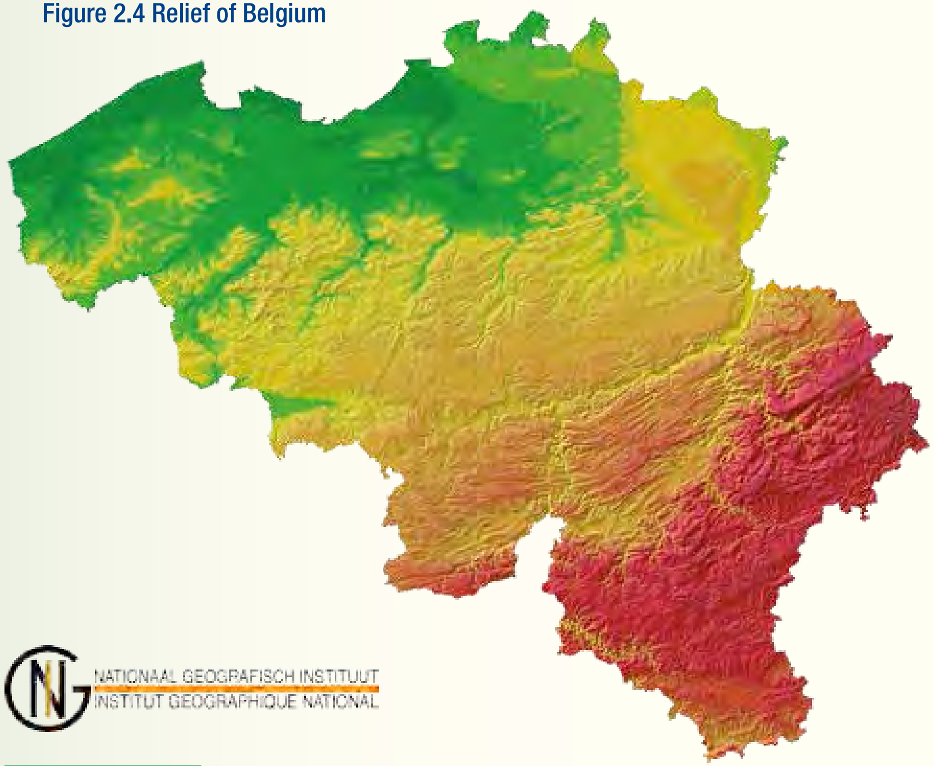


Source: FPS Economy - Belgium statistics, Demographics Department

Brussels (32.6% of the population of Brussels-Capital), and in the industrial regions of the Sambre and Meuse valleys, Belgian Lorraine, the mining regions of Limburg and in border regions.

At national level, in 2011 just over a quarter of the population increase was due to natural movement, in other words the surplus of births over deaths. International migratory movement, which shows a positive balance of 62 157 units, remains the most important source of the total population growth.

Figure 2.4 Relief of Belgium



Source: © National Geographic Institute – A2941

2.3. Geographic and climatic profile

2.3.1. Geographic situation and relief

Belgium is a small country (surface area of 30 528 km²) in north-west Europe. It has 1 482 km of borders with the Netherlands, Germany, Luxembourg, France and the North Sea (its coastline is 73.1 km long). The Walloon Region occupies the biggest part of the territory (55.2%), followed by the Flemish Region (44.3%) and the Brussels-Capital Region (0.5%). Belgium has three zones of elevation, oriented east-west and south-west: the coastal plain, the central plateau and the uplands. The highest points of the uplands constitute a ridge peaking at 694 metres at the 'Signal de Botrange'.

2.3.2. Climate

Its latitude and the proximity of the sea warmed by the Gulf Stream give Belgium a temperate maritime climate characterised by moderate temperatures, prevailing southerly to westerly winds, abundant cloud cover and frequent precipitation. Inland, the months of July and August are the rainiest, while on the coast the autumn months have the highest precipitation levels. The widest temperature range in the course of the year occurs in Belgian Lorraine, in the southern, most continental part of the country, and in Campine, owing to the type of soil [4].

It should be noted that the normal climatological values for the Uccle weather station were revised recently, and they now use 1981-2010 as the reference period rather than 1901-2000 which was still used for the 5th National Communication. In the climatology reports regularly issued by the Royal Meteorological Institute of Belgium, the degrees of abnormality of parameters (exceptional, abnormal, very abnormal, etc.) are now determined in relation to normal values which take into account the temperature increases observed over the past decades.

Table 2.2 shows the average values of different parameters over different periods in the past. This table shows the progression of climate conditions in Brussels-Uccle since the second half of the 19th century.

Internationally, in the context of climate change monitoring - and in particular for the temperature curve - we often refer to the pre-industrial period (1750-1799). Because (certainly within Europe) the average annual temperatures in the pre-industrial period 1750-1799 were very similar to those in the 1850-1899 period, and that in this last period, measurements were available for many more locations, we generally work with 1850-1899 as a reference period [22] to verify climate objectives (e.g. the

2°C objective). This immediately shows that major changes occurred between 1850 and 1899.

Wind

Winds are predominantly southerly to westerly across the entire country. Average speeds are relatively uniform for the entire territory, except on the coast where they are higher. Storms can occur throughout the country between November and March, but are often most violent along the coast.

Table 2.2 Average climatological data over different periods for the Uccle reference station, located in the centre of the country

	1850-1899 average	Old normal values (1901-2000)	New normal values (1981-2010)	2000-2012 Averages	2012
Sunshine (hours)[1]	1 500[2]	1 572	1 545	1 574	1 529
Annual average temperature[3] (°C)	8.8	9.7	10.5	11.0	10.6
Annual maximum[4] temperature (°C)	12.6	13.7	14.2	14.7	14.4
Annual minimum[4] temperature (°C)	5.8	6.2	6.9	7.2	6.8
Total annual precipitation (mm)	758	804.8	852.4	877	976.5
Number of days of precipitation (daily total ≥ 0.1 mm)	195	207	199	197	212
Number of days of frost[4] (min. < 0°C)	63	56	46	43	37
Number of days of winter[4] (max. < 0°C)	15	9	7	6	14
Number of days of summer[4] (max. ≥ 25°C)	13	22	28	29	24
Number of days of heat wave[4] (max. ≥ 30°C)	2	3	4	4	4

1. measurements taken before 1997 were adjusted, by estimation, to the current measurement technique (threshold of 120 W/m² to account for the duration).
2. the value is an average over the 1887-1899 period.
3. the values are obtained using the average daily temperatures (0-24h) calculated using hourly temperatures. The measurements taken in an 'open' shelter before 1968 were reduced, by estimation, to adjust them to the measurements taken since this date in a 'closed' shelter.
4. the values are obtained using the extreme daily temperatures (maximum and minimum) recorded at 8 am. The measurements taken in an 'open' shelter before 1968 were reduced, by estimation, to adjust them to the measurements taken since this date in a 'closed' shelter.

Source: Royal Meteorological Institute of Belgium MIRA (Flanders Environment Report) (VMM - Flemish Environment Agency)

Temperature

Despite its small surface area, temperature varies in Belgium according to its geographic zones. The primary factor behind the variations is distance from the sea. The climate is the most continental in the southeast, in Belgian Lorraine, and is characterised by a greater temperature range between summer and winter. The second factor is elevation, from the coast to the Ardennes. The highest regions have colder average temperatures than the lower-lying lands. The diversity of the relief also gives rise to local differences between the plains and valleys. The different types of soil can also explain regional differences in extreme temperatures. The range of temperatures between the north and south of Belgium is not large in summer. During the winter months, however, the contrast is slightly more pronounced between the coastal region and the Ardennes, the latter combining the effects of altitude and an inland situation.

The average annual temperature for the 20th century, with readings taken at Uccle, has evolved in a global ascending curve relatively in parallel with global warming. In Belgium, temperature measurements showed a clearly increasing trend. Statistical analysis of the annual average temperature at the measuring point in Uccle indicates that this temperature has been rising significantly since the end of the 19th century. Halfway through the 20th century the increase almost came to a standstill, but then the temperature began to rise even more quickly. In recent years the temperature has risen constantly by +0.4°C per decade. In the meantime, the trend line shows that on average, it is 2.3°C warmer here than in the pre-industrial period (figure 2.5) [21; 22].

With an average annual temperature of 11.6°C, 2011 was an absolute record year since measurements started in 1833. 2007 and 2006 complete the top 3 with 11.5°C and 11.4°C respectively. The 17 warmest years since 1833 are all located in the 1989-2011 period, while the 20 coldest years occurred before 1895. With an annual average temperature of 10.6°C, 2012 falls just within the top 20 warmest years [21; 22].

When we examine the annual change in the number of days of summer (TX≥25°C) and the number of days of heat wave (TX≥30°C) over the past four decades, we see that as a general trend, these temperatures are becoming more frequent. Per decade, the number of days of summer increased by three days on average and the number of days of heat wave by half a day on average (cf. table 2.3). On the other hand, the trends in the annual frequency of the number of days of frost (TN<0°C) and the number of days of winter (TX<0°C) are not significant [22].

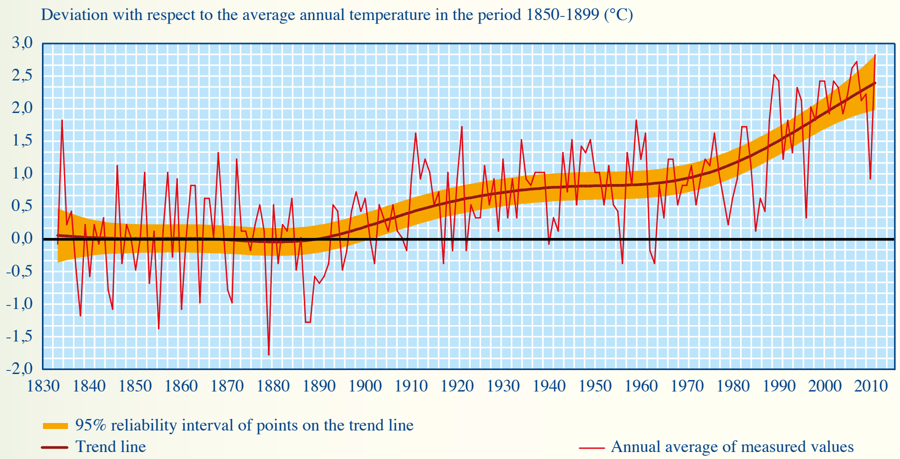
Precipitation

In the north of the country, precipitation increases from west to east, up to the Scheldt estuary. The region with the highest elevation, in the east of Belgium, has the highest precipitation levels. The Hautes Fagnes region has an annual average of 1 400 mm of precipitation, while the centre and north of the country receive from 700 to 850 mm. It rains an average of 220 days a year in the highest points of the Ardennes, compared to 200 days in the rest of the country. The characteristics of snowfall in Belgium depend first and foremost on the altitude of the location, but also on the trajectories of air masses.

2.3.3. Hydrography

The abundant precipitation throughout the year in Belgium and the presence of often impermeable soil favoured the creation of an important network of waterways. Along with an abundant groundwater supply, these provide the national territory with an important quantity of drinking and industrial water, especially in Wallonia.

Figure 2.5 Analysis of trend in average temperature (Uccle, 1833-2011)



Source: MIRA (Flanders Environment Report) (VMM - Flemish Environment Agency) based on data from the Royal Meteorological Institute of Belgium

Table 2.3 Recent trends, by decade, in the annual frequencies of 'hot' and 'cold' temperatures in Uccle (closed shelter)

Decade	Number of days per year			
	where TX ≥ 25°C	where TX ≥ 30°C	where TN < 0°C	where TX < 0°C
1971-1980	20.3	3.3	43.6	6.2
1981-1990	26.5	2.7	48.3	8.8
1991-2000	27.1	4.4	43.9	7.1
2001-2010	30.8	5.0	46.9	6.3

TX is the maximum daily temperature and TN is the minimum daily temperature.

Source: Royal Meteorological Institute of Belgium

Two large rivers, the Scheldt and the Meuse, occupy a major place in the Belgian waterway system. They drain most of the territory although neither river has its source or mouth in Belgium. The basin of the Yser, the third biggest Belgian river, is almost entirely coastal. Small parts of Belgian territory form part of other hydrographic basins: namely those of the Rhine and the Seine. In the northwest, the North Sea borders the Belgian coast along more than 73.1 km.

Maritime Flanders is made up of a coastal region, composed of a narrow strip of beaches and dunes, behind which lie the polders. This strip of extremely fertile clayey soil some 15 km wide that follows the coastline extends along the lower Scheldt up to Antwerp. It has been reclaimed from the sea and the estuaries through drainage. This zone is protected by dykes and is criss-crossed by drainage canals.

2.3.4. Ecosystems

Despite the small size of the country and its slight topographical gradient, the climate and geological conditions have generated several types of ecosystems: Atlantic (dunes, heaths, marshes, peat bogs, prairies, deciduous forests), southern (calcareous prairies, groves, forests) and northern (peat bogs, pine forests). Belgian flora, which is typical of temperate zones, is characterised by forests of broad-leaved trees and conifers, and vegetation of prairies and heaths. At present, only 22.8% of the territory is still wooded. Forests remain in regions where the soil is the least suited to farming and grazing, primarily in the south of the country.

The flora has undergone significant modification, with certain species growing scarce or disappearing. The main causes are abandon of traditional farming practices, intensification of agriculture, increase in built-up areas and roads, flood control efforts, the regulation and pollution of waterways, and atmospheric pollution.

Belgian fauna is typical of temperate Europe. The most common small species include weasel, ferret, hare, rabbit, hedgehog, fox and squirrel. The forests are home to wild boar, roe deer and stags. Wild birds, including falcons, chaffinches, nightingales, owls, pigeons, sparrows and thrushes make up a large part of the animal population. Fish found off the Belgian coast include cod, mackerel, herring and flat fishes (skate and ray, sole, plaice and dab). They are very important commercially because they are caught at sea for their flesh.

2.3.5. Land use and communications

Agricultural land occupies the half part of the national territory, while forests occupy more than 22% (table 2.4). The country is also criss-crossed by a very dense communications network (table 2.5).

Belgium has the second densest rail network in the European Union (after the Netherlands) and the second densest road

Table 2.4 Land use (1990, 2000 and 2009)

	1990		2000		2009	
	Surface (km²)	Proportion occupied	Surface (km²)	Proportion occupied	Surface (km²)	Proportion occupied
Total agricultural land	17 833	58.4%	16 394	53.7%	15 351	50.3%
Forests and other wooded areas	6 980	22.9%	6 944	22.7%	6 971	22.8%
Built-up areas and related plots(1)	4 980	16.3%	5 640	18.5%	6 050	19.8%
Other(2)	536	1.8%	1 356	4.4%	1 961	6.4%
Water	200	0.7%	195	0.6%	195	0.6%

(1) except for scattered farm buildings
(2) fens, heaths, marshes, waste ground, rocks, beaches, dunes

Sources: Estimates by Belgium statistics and FPS Finance (land registry), Belgium statistics (agricultural census) and literature. [5]

Table 2.5 The communications network (2010)

	Length (km)		Evolution 2010/1990	Density (km for 1000 km²)	
	1990	2010		1990	2010
Roads	140 240	155 210	+10.7%	4 593.8	5 084.2
of which motorways	1 666	1 763	+5.8%		
Railways	3 479	3 582	+3.0%	114.0	117.3
Navigable waterways	1 515	1 532	+1.1%	49.6	50.2

Sources: FPB in conjunction with FPS Mobility and Transport, Belgium statistics network. Per thousand km^2, it has four times as many motorways and more than twice as many rail lines as the European Union average. Between 1990 and 2010, the length of the motorway network increased by 5.8% (the length of this network has been stable since 2005), while the length of the rail network has increased by 3.0%.

2.4. Economic profile

2.4.1. Generalities

Until the mid-19th century the Belgian economy was dominated by agriculture, but the country was quickly influenced by the industrial revolution that began in England. The construction of the railway contributed largely to that process, as did the presence of coal, which facilitated the development of heavy industry (especially in the south of the country).

Today, the weight of the manufacturing industries in the Belgian economy has diminished: over the last 30 years, the industrial sector has been surpassed in large measure by services, which currently make up close to 70% of the added value of the different branches of economic activity. The employment market has followed the same trend. In 1970, the industry and service sectors offered approximately the same number of jobs. In 2011, services employed nearly five times as many people as industry. [2]

Belgium has a very open economy, situated at the heart of a zone of intense economic activity. In addition, the port of Antwerp ranks second in Europe (after Rotterdam) and is one of the world's top 10. Exports of goods and services represented 84.8% of GDP in 2012 and imports nearly 83.6%, meaning that the country registered a slight profit. This trade occurs in large measure with the European market. Half of Belgium's exports are sold to Germany, France and the Netherlands, and one fourth to other EU Member States. Imports follow more or less the same proportions. This situation reflects Belgium's role as the hub of the European Union.

Belgium also benefits from the presence of the European Commission in its capital, along with a high concentration of international agencies and service companies. Other international organisations, such as NATO, are also headquartered in Belgium.

2.4.2. Recent developments [6]

The countries that up until 2012 had suffered less of an impact from the euro crisis – the so-called core countries, which include Belgium – also registered a very pronounced weakening of economic activity that year. After a sharp downturn of between 0.4 and 0.6% of economic activity in the euro area in 2012, growth is expected to be very modest in 2013, between -0.9 and 0.3%. Recovery is not expected to begin until 2013; it will probably be progressive and driven primarily by net exports, as domestic demand remains stifled by the debt reduction effort underway in most countries.

The Belgian economy, which registered slightly negative growth of 0.3% in 2012 and a very limited expansion of employ-

Table 2.6 Real GDP growth rate (volume) - Variation (%) from previous year

	1990	2000	2005	2009	2010	2011	2012
UE (27)		3.9	2.0	-4.3	2	1.5	0
Belgium	3.1	3.7	1.8	-2.8	2.2	1.9	0.3

Source: [1, 6]

Table 2.7 Elements of GDP - Variation (%) from previous year

	2006	2007	2008	2009	2010	2011	2012
Gross domestic product	2.7	2.9	1	–2.8	2.4	1.8	–0.3
Agriculture, forestry and fisheries	10.4	-1.2	3.9	-0.1	4.2	7.9	2.4
Industry	1.4	3.3	-0.1	-9.7	5.2	2.4	-2.5
Construction	8.9	1.6	0.9	-1.9	0.5	4.8	1.1
Services	2.5	2.9	2.0	-1.4	1.7	1.9	-0.1

Source: ICN-BNB

ment, has not been insulated from the euro crisis, even if Belgium has paid less of a toll than the countries hit hardest. In 2012, after a lengthy political stalemate, a number of pension and labour market reforms were implemented, along with measures to reduce the government deficit.

Debt stood at 99.6% of GDP at the end of 2012, compared with 97.8% a year earlier. Private sector debt, on the other hand, dropped from 143.8 to 139.9% of GDP in September 2012.

The gradual slowdown of activity that began in the second quarter of 2011 continued in 2012. For the year 2012 as a whole, the volume of GDP decreased by 0.3% after increasing by 1.8% in 2011 (table 2.6). In spite of a hesitant recovery, gross domestic product was still higher in 2012 than in 2008.

The progression of added value slowed in all branches of economic activity (table 2.7). Added value fell sharply in industry, dropping by 2.5% after increasing by 2.4% in 2011. The pace of growth in construction slowed significantly (1.1% in 2012). Growth in services was slightly negative (-0.1%).

The decline in GDP in 2012 (0.4 percentage points) resulted primarily from shrinking domestic demand, basically under the effect of a decline in the volume of spending by the private sector and households, which reduced both consumption and investments. The stagnation of individuals' disposable income and an increase in saving, fuelled by the uncertainty of employment prospects, led to a decline in private consumption.

In 2012, final consumption expenditure by individuals declined by 0.3% in volume after a slight increase in 2011. This positive growth on an annual basis in 2011, however small, was attributable to a sharp progression in 2010, which masked the drop in private consumption that began in 2011. A negative trend in household consumption over such a long period had not been observed since the beginning of the 1980s. Investment in housing also showed a downward trend, falling by 2.8% in 2012 after plummeting by 5.3% in 2011 [6, 7].

On the other hand, spending by public administrations made a slightly positive contribution to economic growth. Final consumption expenditure by public administrations increased by 0.4% in 2012.

Companies put a sharp brake on their investments as a marked slowdown in exports came on top of weak domestic demand. Imports decelerated even more than exports, resulting in a slight increase in the current account balance. For 2012 as a whole, growth in exports of goods and services slipped from 5.5% in 2011 to 0.7% in 2012 [6, 7].

Owing to the high content of imported goods in the country's exports, the slowdown in growth of exports was reflected in the evolution of imports of goods and services. There was nevertheless a slightly smaller increase (+ 0.6%) in imports than in exports, with net exports of goods and services making a slightly positive contribution to GDP growth. The contribution of changes in inventories to GDP evolution amounted to -0.2 percentage points in 2012, compared with +0.6 in 2011 [6].

The downturn in activity was reflected in employment. Job creation in 2012 was limited to barely 8 200 (+0.2%) compared with the 61 600 new jobs created in 2011. The slowdown was most pronounced in employment (growth of 0.1% in 2012 compared to 1.4% in 2011), whereas self-employment was slightly less affected by the sluggish economy, rising by 0.8% in 2012.

In contrast with what occurred during the 2008-2009 crisis, when the adjustment in the volume of work occurred primarily through a decrease in average hours worked per person, the 2012 decline appears to have been absorbed more equally in terms of persons employed and hours worked per person [18]. Average annual inflation was 2.6% in 2012. Twelve months after peaking at 4%, inflation measured by the annual variation in the harmonised index of consumer prices temporarily dropped to 2% in July 2012, i.e. the lowest level of growth in prices since March 2010. Inflation then rose to 2.6% from August to October before slowing later in the year, dropping back to 2.1% in December. Annual average inflation fell from 3.5% in 2011 to 2.6% in 2012. This decrease is the effect of more moderate increases in energy prices, which more than compensated for the slight increase in underlying inflation and the sustained increase in unprocessed food prices [7].

2.5. Energy profile

2.5.1. Primary consumption

Belgium has limited energy resources and is consequently highly dependent on other countries for supply, particularly since the end of the coalmining era (the last mine was shut down in 1992). Belgian energy policy is therefore guided by the concern to diversify both its sources of supply and its suppliers. Alongside petroleum imports, the country has considerably expanded the use of natural gas and, more recently, the use of renewable sources of energy. The government has also programmed the withdrawal from nuclear energy.[5]

Primary energy consumption rose by an annual average of 0.1% over the years 2000-2011 and by 0.9% between 2007 and 2011 (table 2.8). There are marked differences from one source to the next within this general increase. Coal declined sharply and accounted for only 4.8% of total consumption in 2011, in particular due to declining demand by certain sectors (coking plants and power stations). Consumption of petroleum and of nuclear energy remained relatively

[5] Law on the Phase-out of nuclear energy for industrial electricity production of 31 January 2003 (published in MB on 28 February 2003) and amended by decision of the restricted ministerial committee of 4 July 2012 on the package decisions on security of electricity supply.

stable. Renewable fuels progressed significantly (9.2% of total consumption in 2011 with an annual evolution of 43.4% since 2000), and now surpass coal. The overall rate of dependence (ratio of net imports to gross domestic consumption of primary energy) was 80.98% in 2011.

Belgium's crude oil supply comes from a variety of sources, but there seems to be a growing dependence on two major production areas, Russia and Central Asia on the one hand, and the OPEC countries on the other.

Energy intensity (the ratio of primary energy consumption to GDP expressed in volume) measures the quantity of energy consumed by the economy to generate one production unit. It has been decreasing regularly since 1990, dropping in 2011 to 55% of the 1990 level (i.e. 64.95 Kgoe/EUR 1000 in 2011).

The link between economic growth and primary energy consumption weakened over the period under consideration (1990-2011). This dissociation of growth in economic activity from that of energy consumption is often presented as one of the objectives of sustainable development [8].

2.5.2. Final consumption

Final energy consumption, i.e. gross apparent energy consumption after deduction of processing activities and energy loss, amounted to 44 287.39 ktoe in 2011.

In Belgium, buildings (residential and tertiary) are the number one final consumer of primary energy (33.7%), followed by industry (30.9%) and transport (20.7%). Non-energy uses, an activity indicator for the petrochemical industry (naphtha, natural gas), also account for a substantial part of consumption (table 2.9). Overall final energy consumption dropped at an annual rhythm of 0.06% from 2000 to 2011.

In terms of market shares of total final consumption, petroleum remains the dominant energy (45.32% in 2011), followed by gas (28.28%), electricity

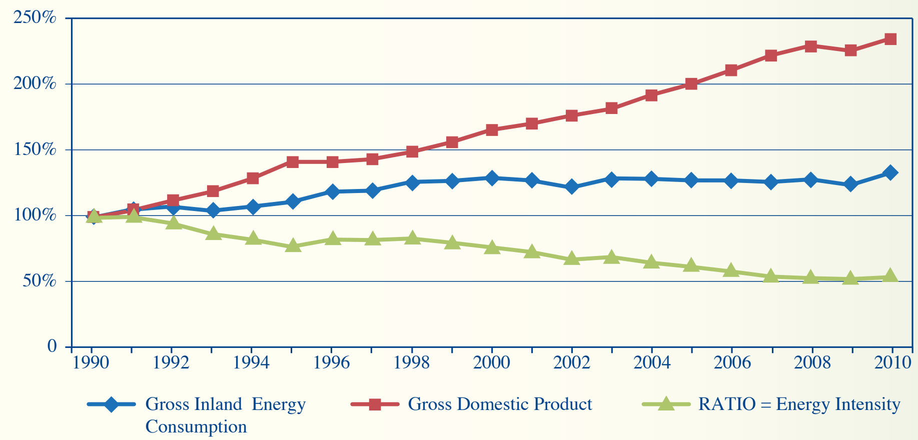
Table 2.8 Evolution of primary energy consumption

Gross apparent consumption in 2011, in Ktoe (NCV), and average annual growth rate in % calculated for the periods 2000-2011 and 2007-2011

	2011	Évolution 2000-2011 (annual)	Évolution 2007-2011 (annual)
Solid fuels	2 925 4.8%	-5.9%	-9.1%
Petroleum, petroleum products	22 953 37.6%	-0.6%	-0.1%
Natural gas	16 698 27.4%	+2.2%	+2.9%
Renewable fuels	5 596 9.2%	+43.4%	+23.0%
Nuclear energy	12 570 20.6%	+0.0%	+0.0%
Other (primary electricity)	288 0.5%	-2.7%	-14.4%
TOTAL	**61 030**	**+0.1%**	**+0.9%**

Source: FPS Economy – Belgium statistics

Figure 2.6 Primary energy intensity



Source: FPS Economy – Belgium statistics

(15.56%), renewable fuels (7.51%), heat (1.67%) and solid fuels (1.66%). In the industrial sector, petroleum (11.28%) is clearly surpassed by natural gas, which maintained a market share of 37.32% in 2011. Electricity accounts for 23.41%, renewable fuels 19.60%, solid fuels 4.59% and heat 3.80%.

In the residential (and equivalent) sector, natural gas remained the leading fuel in 2011 with 45.99% followed by petroleum (26.07%), electricity (23.77%), renewable fuels (1.99%), heat (1.48%) and solid fuels (0.71%).

For the years 2000-2011, solid fuels registered an average annual decline of 13.2%, while renewable fuels progressed sharply with average annual growth of 23.1%. For other energy carriers, the trend was relatively stable during the period under consideration.

2.5.3. Electricity and gas prices

As a result of the new method introduced at EU level in 2008, prices are now collected on the basis of consumption brackets with lower and upper annual consumption limits, rather than on the type of consumer.

Prices for each consumption bracket represent averages weighted according to the market shares of the different suppliers operating on the Belgian electricity market (cf. table 2.10).

The price for an average household is represented by the consumption bracket Dc (2500 to <5000 kWh/year). The progression of domestic electricity prices since market deregulation has been affected by varying distribution costs in the different regions. Therefore, consumers in Flanders have benefitted from more advantageous conditions due to geographic and urban planning related factors. A system of 100 free kWh per connection and household member is also

Table 2.9 Evolution of final energy consumption (consumption in 2000 and 2011, in Ktoe (NCV), and average annual growth rate in % calculated for the period 2000-2011)

	Final consumption (Ktoe) 2000	Final consumption (Ktoe) 2011	Annual average rate (%) 2000-2011
Industries	14 111 31.7%	13 686 30.9%	-0.28
Transport	9 598 21.5%	9 163 20.7%	-0.42
Residential and equivalent	14 373 32.3%	14 916 33.7%	+0.34
Non-energy uses	6 480 14.5%	6 523 14.7%	+0.06
TOTAL	**44 562**	**44 287**	**-0.06**

Source: FPS Economy – Belgium statistics

Table 2.10 Evolution of electricity prices (in euro cent/kWh, including tax) for residential consumers in Belgium between 2000 and the first half of 2012

Type of consumer [a]	2000	Consumption brackets [b]	2008	2012	Evolution from 2008-2012
Da (annual consumption: 600kWh)	20.30	Da (<1 000 kWh)	27.85	29.21	5%
Db (annual consumption: 1 200kWh)	18.55	Db (1 000 to <2 500 kWh)	21.71	23.27	7%
Dc (annual consumption: 3 500kWh of which 1 300kWh at night)	14.33	Dc (2500 to <5 000 kWh)	19.72	23.27	18%
Dd (annual consumption: 7 500kWh of which 2 500kWh at night)	13.20	Dd (5000 to <15 000 kWh)	17.68	19.34	9%
De (annual consumption: 20 000kWh of which 15 000kWh at night)	8.40	De (> = 15 000 kWh)	15.92	18.35	15%

Source: Eurostat. [a]: old method; [b]: new method in place in the region and inhabitants therefore pay less for their electricity consumption. Customers in Brussels and Wallonia, on the other hand, who do not benefit from this system, have seen their electricity bill increase [9].

Table 2.11 presents an overview of the composition of the price of energy and the weight of its different components for an average residential customer in Belgium. The figures clearly indicate the large share represented by distribution in the customer's annual total, some 30% of the electricity bill. Since there can be significant differences between regions, especially with regard to public service obligations and levies, the composition is shown separately for Flanders, Wallonia and Brussels.

2.5.4. Electricity generation and consumption

In 2011, total primary electricity generation amounted to 90 168 GW. The average annual increase was 0.7% for the years 2000-2011 (table 2.12). In 2011, it was generated by nuclear power plants (53.5%) and by classic thermal power plants (34.5%) (solid fuels 3.8%, gaseous fuels 30.4% and liquid fuel 0.3%). The remaining 12.0% was generated by pumped-storage power plants (1.4%), hydraulic energy (0.2%), wind/solar/geothermal energy (3.9%) and renewable/recovery fuels connected to the electricity system (6.5%). The share of liquid fuels in electricity generation has been dropping for a number of years. From 52.7% in 1971, it had slipped to a mere 0.1% in 2011.

Table 2.11 Composition of electricity prices for an average residential user

	Flanders		Wallonia		Brussels	
	2009	2011	2009	2011	2009	2011
Supplier's price	37%	34%	43%	42%	44%	43%
Distribution (excluding public levies)	32%	35%	27%	26%	25%	27%
Energy tax and VAT	19%	18%	18%	18%	18%	18%
Public levies	2%	4%	3%	5%	7%	7%
Transport (excluding public levies)	5%	4%	5%	4%	5%	4%
Renewable energy and cogeneration contributions	5%	5%	4%	5%	1%	1%

Source: CREG [10]

Table 2.12 Electricity generation: structure (2011) and evolution (average annual growth rate as % calculated for the period 2000-2011)

		2011		2000	Annual evolution (%) 2000-2011
PRIMARY PRODUCTION		90 168		83 894	0.7%
Nuclear		48 234 53.5%		48 157	0.0%
Hydraulic		196 0.2%		459	-7.4%
Pumped-storage power stations		1 227 1.4%		1 240	-0.1%
Geothermal, solar, wind, etc.		3 548 3.9%		15	64.4%
Renewable and recovery fuels		5 860 6.5%		1 219	15.3%
Fossil fuels	Liquid fuels	290	34.5%	32 804	-0.5%
	Gaseous fuels	27 409			
	Solid fuels	3 404			
IMPORTS		13 189		11 645	1.1%
EXPORTS		10 652		7 319	3.5%

Source: FPS Economy, Belgium statistics

Final electricity consumption increased at an annual rate of 0.3% during this same period. Consumption by the residential and tertiary sectors, which used to be virtually equal to that of the industrial sector, has now surpassed the latter (51.5% compared with 46.5%,) due to a more sustained progression (1.2% compared with -0.6%). The slowdown of industrial sector consumption can be partially attributed to the crisis and a reduction of activity. The remaining 2.0% is consumed by the transport sector.

2.5.5. Renewable energy

The share of renewable energy in primary energy generation in Belgium has progressed significantly (from less than 1% for the years 1990-2000 to 7.9% in 2011) [11]. Despite certain limits to the development of renewable energy, related in particular to the country's small size, the public powers are promoting the development of this type of energy as a response to the issues of security of energy supply, polluting emissions, optimisation of local resources and job creation.

Directive 2009/28 of the European Union sets a target for Belgium of 13% renewable sources in final gross energy consumption by 2020. The implementation of numerous wind turbine projects, particularly offshore, is expected to make a significant contribution to achieving this target. Over the longer term, renewable energy is

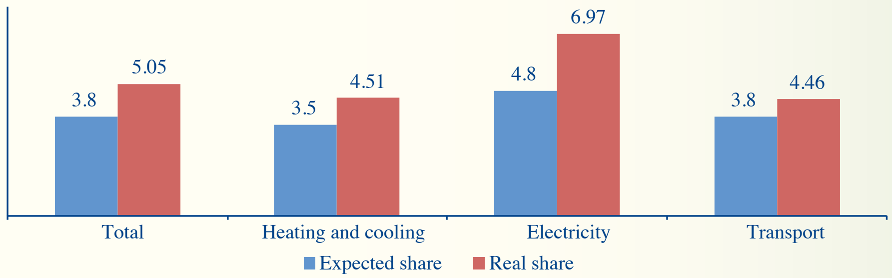
Table 2.13 Electricity consumption by sector (in GWh)

	2011	2000	Annual evolution (%) 2000-2011
Industry	37 261 (46.5%)	39 868	-0.6%
Transport	1 631 (2.0%)	1 443	1.1%
Domestic and equivalent*	41 223 (51.5%)	36 231	1.2%
Final consumption**	80 115 (100%)	77 542	0.3%

* This includes businesses & services, domestic use and agriculture
** Final consumption considered here excludes consumption by the energy sector (different definitions of IEA/Statistical Office of the European Union)

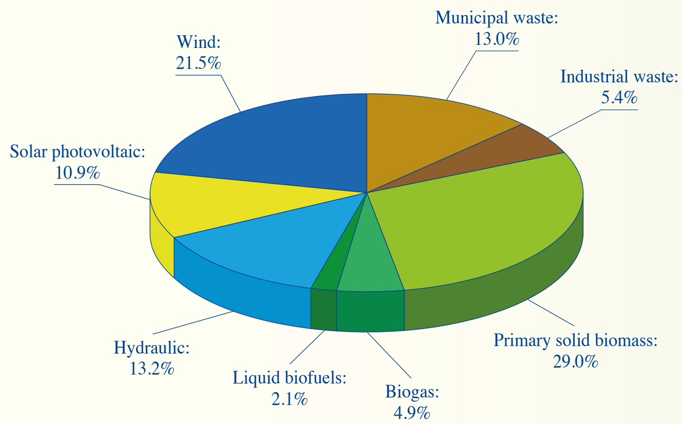
Source: FPS Economy, Belgium statistics

Figure 2.7 Comparison between expected and real shares of renewable energy in consumption (as %) in 2010



Source: Belgium statistics [12]

Figure 2.8 Contribution of different sources to gross electricity generation from renewable sources (2011)



Source: FPS Economy, Belgium statistics expected to account for a large share of primary energy generation in Belgium. The four ministers (federal and regional) with responsibility for energy launched in 2011 a feasibility and impact study by a consortium of three scientific institutions on the evolution of the Belgian energy system towards an energy mix made up exclusively of renewable sources by 2050.[6] In 2010, Belgium advanced further than expected in the trajectory for all its sub-targets (renewable heating, electricity and transport (cf. fig. 2.7).

In 2010, renewable energy (hydraulic, wind, biomass and recovery fuels) represented 6.8% of primary electricity generation.

The main renewable energy source used in Belgium is biomass (figure 2.8).

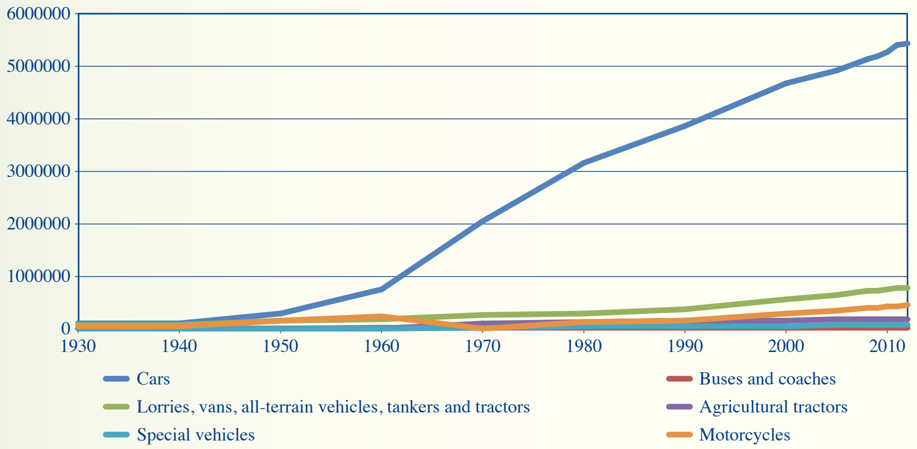
[6] Towards 100% renewable energy in Belgium in 2050. Federal Planning Bureau, ICEDD, VITO – 19 april 2013 - 2nd ed. http://www.icedd.be/I7/mediatheque/energie/renouvelable/130419_Backcasting_FinalReport.pdf

2.6. Transport

2.6.1. General description

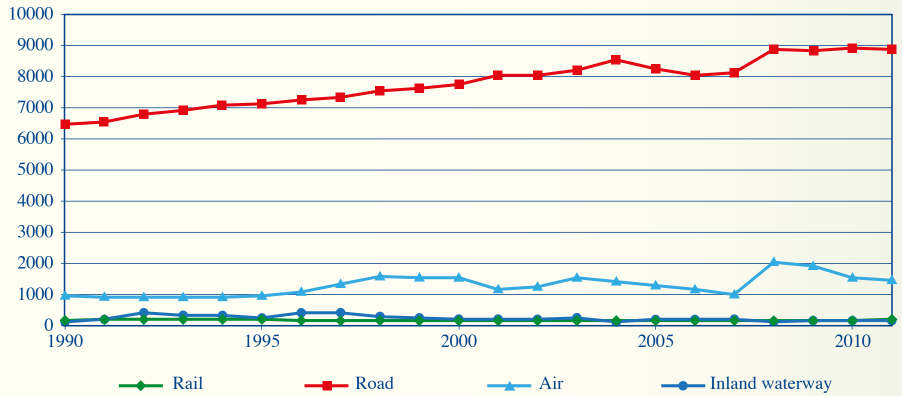
Belgium, densely populated and situated at the centre of Europe, is a major centre for transit. The country's economic activity, which is strongly export-oriented, requires a dense road and rail network (one of the densest in the European Union), and also relies on inland waterways. The expansion of the intra-European area has further increased transit traffic, resulting in constant growth of transport, a heavy consumer of petroleum products (figure 2.10). This growth particularly concerns road and air transport. Road transport is the most energy-consuming means in Belgium (8 859 000 toe in 2011), consuming the most energy per unit transported by km on land. The number of passenger cars has skyrocketed over time (figure 2.9) and is not conditional upon the economic context (motorisation rate in Belgium: one car for every two inhabitants).

Figure 2.9 Vehicles: total number of vehicles registered in Belgium on 01/08/yy (1930-2012)



Source: Eurostat

Figure 2.10 Transport final energy consumption - by each mode of transport (1 000 toe)



Source: Eurostat

The motorisation rate remains high with 5.5 million cars for 11 million inhabitants in 2012. On average, each car covers 15 500 km. The same trend has also been noted in other European countries.

Recent trends also tend to demonstrate that new technologies serving to boost vehicle fuel efficiency are not being developed fast enough for the moment to offset the rise in energy consumption linked to increased road traffic.

2.6.2. Passenger transport

If personal mobility is expressed in passenger kilometres travelled, cars are still the main means of transport in Belgium (79.1% of all motorised mobility in 2011 were by car or motorcycle). Public transport makes up only 5.8% of passenger transport (table 2.14).

Passenger car use has continued to rise over the past years, although to a lesser extent than public transport (bus, tram, underground and railway). This continuing rise in the use of motor vehicles for passenger transport can be explained by the following factors:

- 'De-urbanisation' and the dispersion of housing (or the growth of outlying urban areas);
- Development of the services sector, combined with limited polarisation in the establishment of businesses and companies;
- An increase in households' leisure time;
- A reform of the taxation on company cars which takes greater account of CO_2 emission but which remains quite favourable to the acquisition of company cars and encourages the use of company cars for personal purposes;[7]
- The development of Brussels as national capital and seat of the European institutions, which generates employment, but also additional commuters;
- The increasing complexity of mobility patterns, encouraging more frequent use of cars (see the MOBEL 1999 and BELDAM 2010 surveys);
- Mobility practices and households' choice of comfortable vehicles whose occupation rate is ever lower (See high motorisation rate).

The combination of these factors, which all lead in the same direction, risks persistence of the present growth of passenger road traffic and the resulting emissions (according to the Federal Planning bureau, the number of passenger kilometres will grow by 30%, the number of tonnes-kilometre by 60% and greenhouse gas emissions by 18% between 2005 and 2030).

The growing saturation of roads, moreover, is leading to an increase in fuel consumption (and emissions) that is rising faster than the number of kilometres travelled. Paradoxically, deteriorating traffic conditions caused by the reduction of the average speed on the road network encourages people to use their cars ("*to save time*") rather than public transport, which further worsens the problem.

Finally, the growing use of diesel fuel in Belgian passenger cars (over 62.5% of cars in Belgium ran on diesel in 2012) is also having an impact on the evolution of emissions (lower for CO_2, but higher for NO_X and PM). The use of air conditioning is also rising sharply.

Table 2.14 Evolution of road mobility in 2011 (expressed in passenger kilometres)

Billion passengers-km/year	CARS and motorbikes	PUBLIC TRANSPORT (underground, tram, bus)	COACHES	RAILWAY
TOTAL 147.3	**116.51**	**8.61**	**11.33**	**10.85**
Flanders:	65.95	4.48	4.98	
Wallonia	47.20	2.31	5.56	
Brussels Capital Region	4.32	1.82	0.80	
RELATIVE SHARE AS A %	**79.1%**	**5.8%**	**7.7%**	**7.4%**
in 2000:	82.8%	6.0%	8.1%	6.0%
EVOLUTION 2000-2011	**+9.4%**	**+113.0%**	**+9.1%**	**+39.9%**
in 1960:	47	Increase since 1960:	147.9%	

Source: FPS Mobility and Transport, Belgium statistics, and SNCB

[7] Since 2011, the benefit in kind for company cars no longer takes into account the distance between home and work, so it is independent of the number of kilometres travelled for personal use.

Household spending on transport rose more rapidly than total consumption, increasing from 11.7% in 1995 to 12.9% in 2011.

So-called 'clean vehicles' (≤ 115 g CO_2) gained a 31.9% market share in 2012 [13].

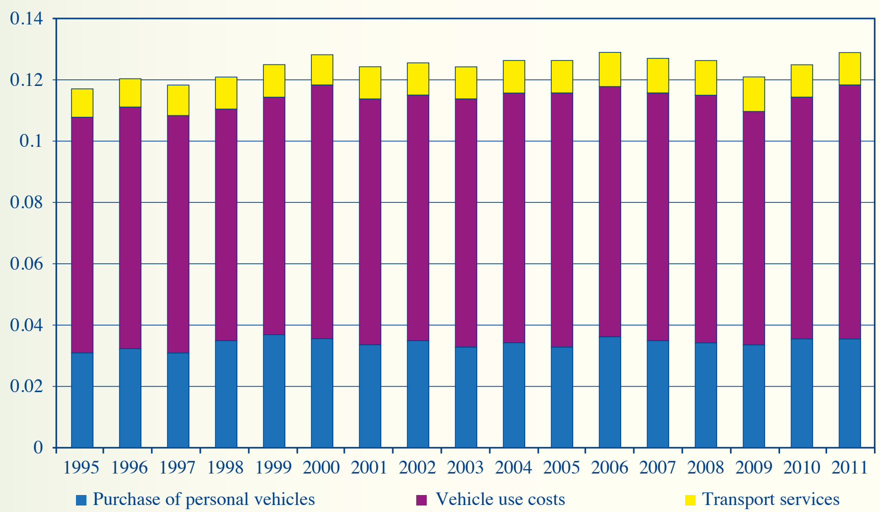
As alternative means of transport, the sale of two-wheeled motor vehicles is rising and the use of bicycles is more common in northern Belgium. While in Brussels this trend is on the rise, it is stagnating in Wallonia.

Public transport

All the public modes of transport are expanding significantly following efforts by the authorities to provide more sustainable transport and more customer-focused private policies.

The decrease in market share experienced by public transport in the past has stopped and the various public transport companies are investing significantly to increase their capacity.

Figure 2.11 Evolution of spending on transport as part of total household consumption in Belgium (%) at current prices



Source: Federal Planning Bureau

2.6.3. Transport of goods

All modes of freight transport are increasing significantly in Belgium due to the country's geographic location - at the heart of the main European markets - and its logistics and transport expertise. Global transport volumes have decreased since the economic crisis of 2008 and growth is forecast to return to normal due to global economic growth (China, Brazil and India, for example).

Road transport (with an approximate 72.6% market share) accounts for most of land transport, as it continues to be flexible, reliable and offer a competitive price, and wins out over inland waterways (an approximate 15.3% market share) and rail transport (around 12.5%). However, there has been a significant growth in the amount of freight transported by rail and the inland waterway network.

The tonnages transported are increasing for all modes of transport (cf. tab. 2.15).

Table 2.15 Evolution of goods transport

	Million tonnes km		Relative share (%)	
	(2007)	(2011)	(2007)	(2011)
Inland waterways	9 006	9 251	13.5%	15.3%
Rail	9 258	7 593	13.9%	12.5%
Road	48 495	43 658	72.6%	72.6%

Source: FPS Economy - Belgium statistics, Eurostat

2.7. Industrial sector

In the past, iron and steel, mechanical engineering, textiles and chemicals were the flagships of Belgian industry, largely for export. Since 1960, however, in Belgium as in other parts of Europe, the profile of industry has undergone profound changes. Its importance in the economy has declined and its structures and spatial distribution have been transformed. Figure 2.13 shows the progression of added value in the main branches of economic activity in the industrial sector since 2000.

In 2012, added value in industry dropped sharply (downturn of 2.5% after having increased by 2.4% in 2011). The rate of growth in the construction sector has slowed considerably[8] [6].

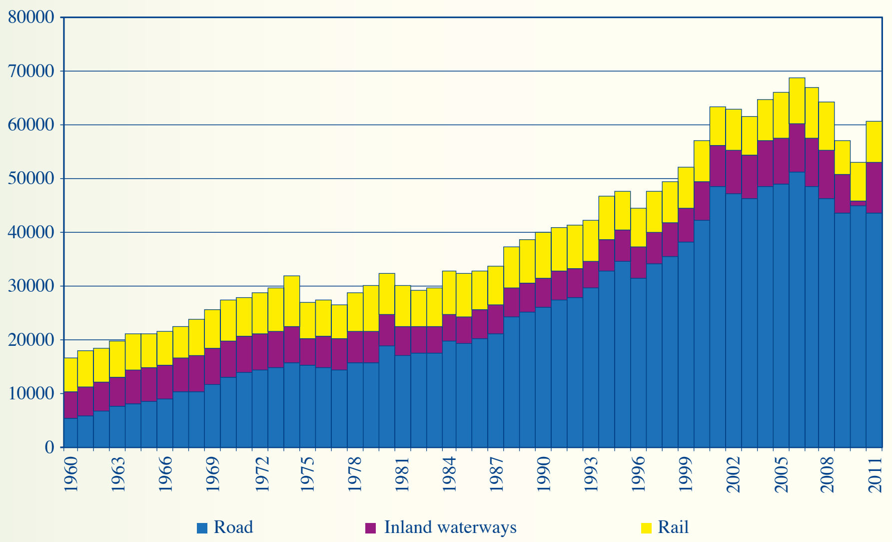
2.7.1. Metallurgy

This declining sector includes iron and steel and the processing of steel and non-ferrous metals. It is primarily made up of large firms situated at the heart of the former industrial regions of Wallonia but also in Flanders, where sites are more dispersed. In the 1970s, the crisis in the sector resulted in major restructuring plans. All these changes led to the redefinition of organisations and production tools. The latter have also evolved following technological improvements.

Following an extremely favourable economic situation in 2007 driven by demand from user sectors, which even justified a furnace being reopened, the burst of the financial bubble and resulting crisis completely reversed the trend. In 2008 and 2009, the technology industry was severely affected by the crisis. During 2010 and 2011, most activities performed by technology companies saw an improvement, mainly thanks to exports. However this brighter economic climate appears to have been short-lived in view of the latest trend data. External demand has dropped, exports of goods and services are dropping as activity is slowing down among our main neighbours [14].

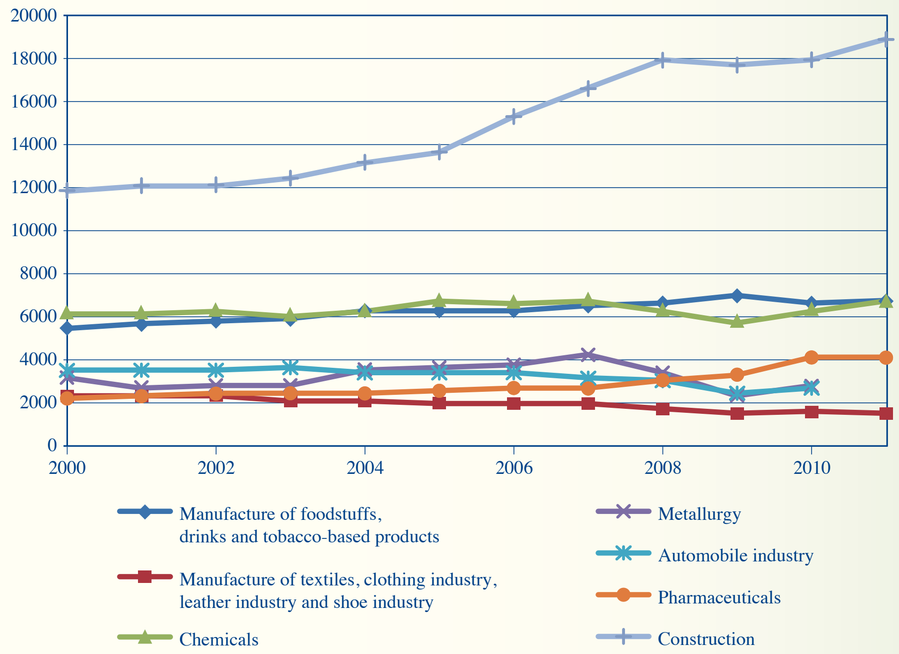
[8] For the construction sector, refer to section 2.9 'Housing stock'

Figure 2.12 Goods transport expressed as million tonnes km (1960-2011)



Source: FPS Economy - Belgium statistics

Figure 2.13 Progression (2000-2011) of added value in the industrial and construction sectors for the main branches of economic activity



Source: National Accounts Institute, National Bank of Belgium, Belgostat online

2.7.2. Agri-foods

In Belgium, the agri-foods sector holds a key place in the manufacturing industries. Agri-foods is Belgium's third most important industrial sector in terms of added value. It is also the second largest employer and characterised by a very high number of SMEs. Exports account for half its turnover. The main sub-sectors are meat, milk, chocolate, sugar and drinks. The agri-food industry has links with a whole series of other economic sectors such as agriculture, retail trade, pharmaceuticals, chemicals, packaging and logistics.

Since 2005, the Belgian food industry has expanded over 44% in terms of turnover. The explanation for these good results in this time of crisis is exports.

The ratio of exports went from 46% in 2004, to 52% in 2012.

Between 2002 and 2012, employment in the food industry increased by 2% [15].

2.7.3. Textiles

For several centuries, textiles were an important and renowned activity in both the north and south of Belgium. In recent decades, this industry has contracted and is now limited mostly to the Flemish Region, which accounts for 90% of national production. The sector has suffered from the lower wage costs practised outside of Europe.

In 2012, the Belgian textiles industry represented a turnover of 5.8 billion EUR and employed 21 833 workers.

The turnover in the textiles industry dropped in 2012 by 6% after it still enjoyed an increase of 2.1% in 2011. The decline in economic activity was already perceptible during the last quarter of 2011 and it worsened throughout 2012. Despite an increase in activity in the 2010-2011 period, in 2012 the turnover in the textiles industry was still almost 15% below the level it reached in 2007, the last year before the Great Recession.

The rather sluggish activity in 2012 had an impact on employment. Between mid-2011 and mid-2012, about 1 500 jobs were cut (-6.4%) in the Belgian textiles industry. Today the industry still employs about 22 000 people. [16]

2.7.4. Chemicals

Chemicals represent more than one fifth of the turnover of Belgian industries and over 20% of the country's total exports. Since 2002, turnover has progressed at a rate similar to the annual average growth rate.

Belgium ranks 10th globally in the chemical sector, accounting for around 4% of global trade. The Belgian chemical sector produces a wide range of products.

The sector is one of the most specialised in the world and is the second manufacturing sector in Belgium. Turnover exceeded 54 billion EUR in 2012. The best-performing sub-sectors were pharmaceuticals, base chemicals and soaps/detergents/cosmetics. Direct employment in the sector has remained relatively stable over the past 30 years (with a drop of 0.7% in the number of direct jobs in 2012) despite a trend for a decline in the number of jobs in the manufacturing industry since the 1980s. The sector's share in total industrial employment is constantly growing and it represented 17.7% in 2012.

The chemicals and life sciences sector is very export orientated. We have seen a marked rise in exports these last ten years. Exports of chemicals, plastics and science-based products represented 31.8% of total goods exports in 2012. Investments in the industry reached 2.75 billion EUR in 2012. This figure encompasses both new investment and the expansion of production capacity. Almost half of this investment is carried out in base chemicals of which two-thirds in the Antwerp region [17].

2.7.5. Mechanical engineering

The automotive industry in Belgium is limited to assembly, which occurs mostly in large plants owned by multinational firms. Railway construction has a strong presence in Belgium, as does the highly technological aviation sector.

The entire automotive industry (assemblers, manufacturers and importers) has a considerable influence on the economy and employment. The automotive industry and related services (vehicle and fuel trades, maintenance and repairs etc.) accounts for over 107 000 jobs (tab. 2.16).

Table 2.16 Number of sites and jobs in the automotive sector

	Number of sites in 2007	Number of sector employees in 2007	Number of sector self-employed in 2006
Walloon Region	2 877	19 979	4 546
Brussels-Capital Region	594	7 992	468
Flemish Region	4 702	66 626	7 587
Belgium	8 173	94 597	12 601

Sources: ONSS - decentralised statistics 31 December 2010 and ICN (Belgian National Accounts Institute) - Regional Accounts 2010, calculations by le Forem [18]

2.8. Waste

Overall, waste generated in Belgium rose to 62 537 thousands of tonnes (2010), up 3.5% compared with 2006. The major waste producers were industry (55%) and construction (29%) (cf. fig. 2.14). Only industry and the construction sector saw their volumes increase between 2004 and 2010.

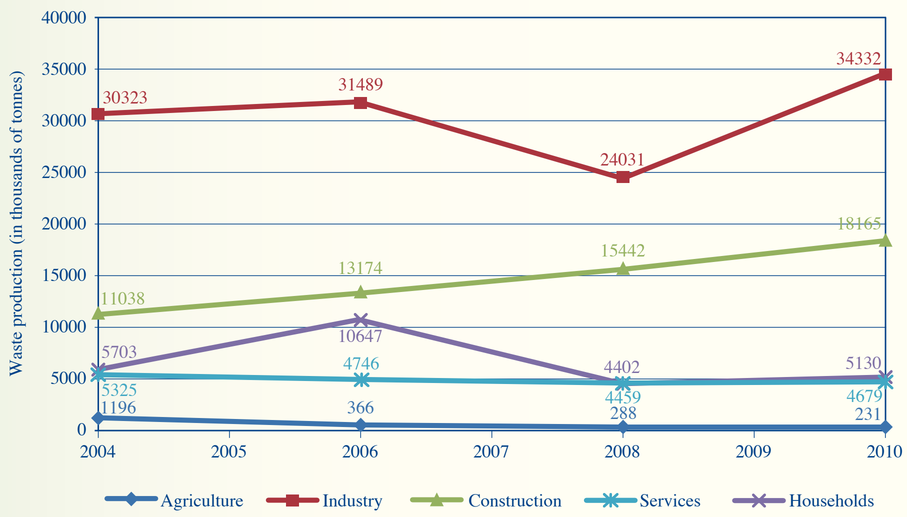
From 1996 to 2007, the quantity of municipal waste increased by 10% (fig. 2.15). From 2007 to 2011, this figure dropped by 6%. Significant improvements in waste treatment have helped to sharply reduce the amount of waste put into landfills (figure 2.16). The problem of reducing waste production nevertheless remains a priority issue for the authorities.

There has also been remarkable progress in the recycling of industrial and household packaging.

The two accredited bodies for packaging waste (FostPlus for household packaging and Val-I-Pac for industrial packaging) have taken over the obligation to take back packaging.

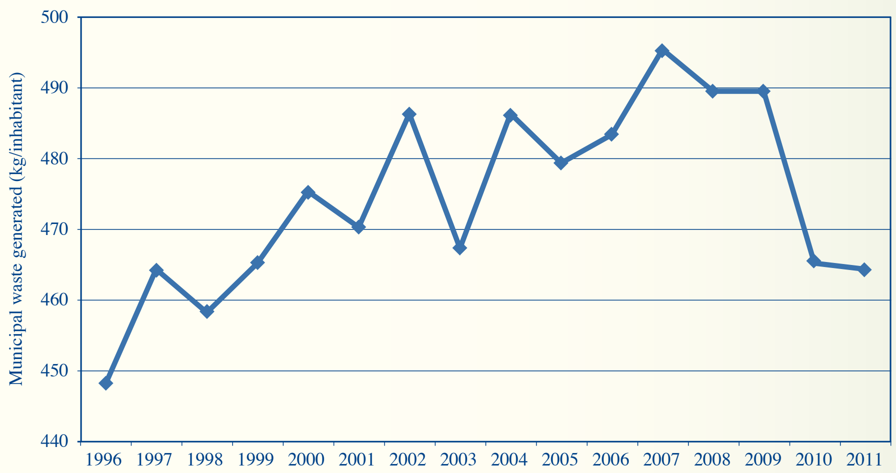
These high rates of recycling and recovery are also obtained at a relatively reduced annual cost (in 2011 the cost was EUR 5.7 per inhabitant). [19]

Figure 2.14 Waste production by economic activity (2004-2010)



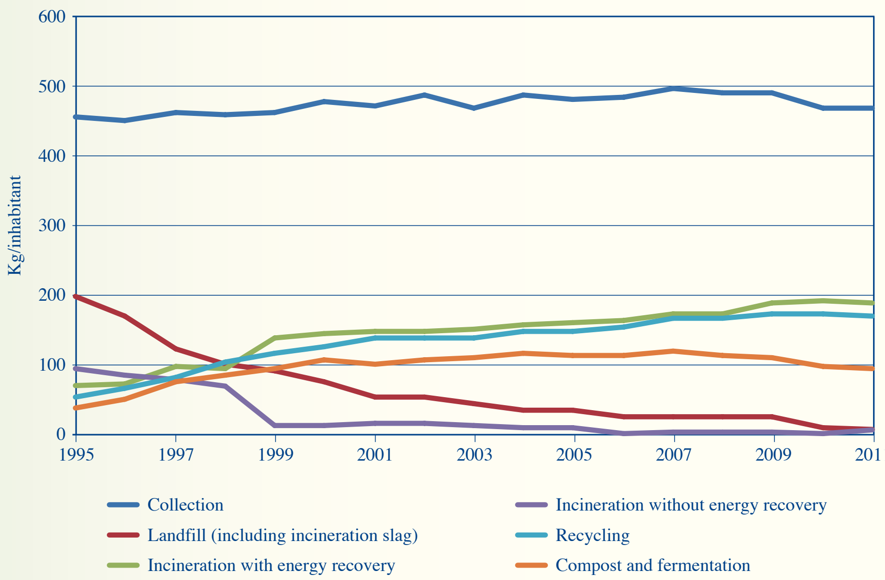
Source: Belgium statistics on surveys and administrative sources (OVAM (Public Waste Agency of Flanders), IBGE-BIM (Brussels Institute for the Management of the Environment), DGARNE (Directorate-General Agriculture, Natural Resources and the Environment) and models. Additional data and information: Eurostat

Figure 2.15 Evolution of the quantity of municipal waste generated per inhabitant (1996-2011)



Source: Eurostat

Figure 2.16 Distribution of municipal waste treatment methods in 1995 and 2011



Source: Belgium statistics based on surveys and administrative sources

Table 2.17 Recycling results (2010) of the accredited bodies for packaging waste

	Fost Plus	Val-I-Pac
Glass recycling	114.7%	n.a.
Paper and cardboard recycling	114.6%	96.1%
Beverage carton recycling	78.7%	n.a.
Metal recycling	102.1%	85.1%
Plastic recycling	37.9%	55.7%
Wood recycling	n.a.	64.6%
Total recycling	83.2%	81.6%
Paper and cardboard recycling without membership (in T)	25 558 T	
Glass recycling without membership (in T)	31 991 T	
Metal recycling without membership (in T)	1 706 T	
Incineration of PMC (plastic metal and drinks cartons) residue	26 792 T	
Recovery	94.5%	90.0%

Source: ICE 2011 annual report, FostPlus 2011 annual report

2.9. Housing stock

The latest complete set of data on the housing stock in Belgium dates back to the 2001 socio-economic study whose results were presented in the 4th National Communication. Since 1999, monthly surveys of 300 households (400 as of 2012) have been carried out with responses being inferred for the total population (survey of household budgets). Since 2010, the results of the survey have been published on a biennial basis. Since 2003 Belgium has also participated in the EU-SILC project (European Union Statistics on Income and Living Conditions) whose sampling is more inclusive (at least 4 750 households according to Regulation (EC) No 1177/2003). This calculation method for 2001 leads to some differences in the figures between the two sources of information.

In 2011 approx. three households out of four still lived in a single-family house (71.6%) and one out of four (27.5%) in a flat. The proportion of households occupying flats has somewhat increased over the past years (see figure 2.17).

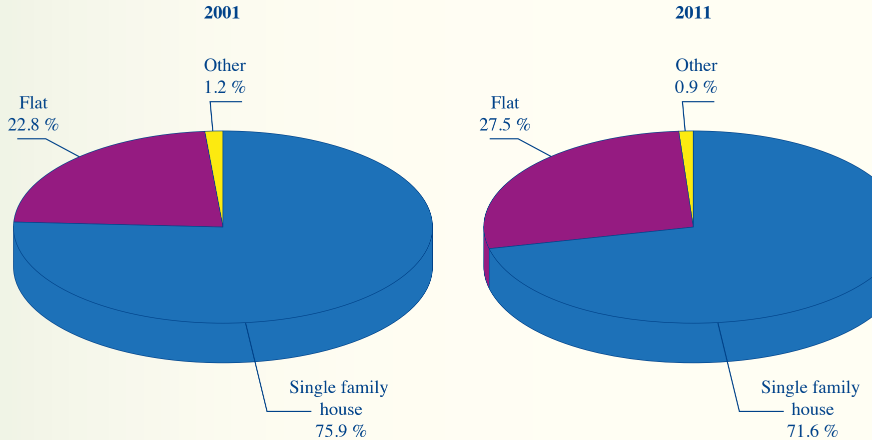
In 2010, Belgian housing stock remained old with less than one person in five (18.6%) living in housing built within the past 30 years. However, 71.9% of households owned their homes.

The number of families equipped with central heating has continued to rise and reached 81.7% in 2010 compared to 75.2% in 2000. The most commonly used fuel is natural gas (57.0%). This increase was mainly to the detriment of fuel oil (30.8%) (see figure 2.18). The popularity of coal also continued to wane, accounting for only 0.7% in 2010.

In addition to heating, a significant amount of energy is also consumed by domestic appliances. The following table provides an overview of these appliances (table 2.18). The figures reflect both the extension in modern conveniences and the development of technology.

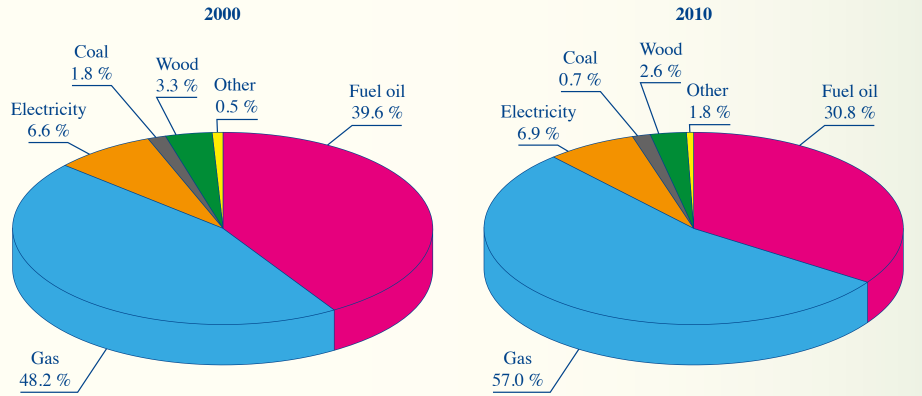
The survey of household budgets 2010 also shows that 4.7% of households have photovoltaic panels at home and 1.8% have solar thermal panels to heat water. Finally, 24.4% use rainwater for bathrooms, washing clothes or cleaning.

Figure 2.17 Breakdown of types of housing in 2001 and 2011



Source: FPS Economy - Belgium statistics - 2001 socio-economic study & EU-SILC 2011

Figure 2.18 Energy or fuel used primarily for heating



Source: FPS Economy - Belgium statistics - Survey of household budgets 2001 & 2010

Table 2.18 Proportion of households with domestic appliances in 2001 and 2010

	2001	2010
Large household appliances		
Electric cooker	62.5%	68.9%
Natural gas cooker	28.3%	27.4%
Gas cooker using gas cylinders	11.5%	6.6%
Other type of cooker	3.9%	3.4%
Microwave oven	74.2%	87.2%
Dishwasher	42.3%	54.6%
Fridge	67.7%	67.9%
Fridge freezer (two door)	39.2%	44.5%
Freezer (chest freezer or upright freezer)	63.2%	62.0%
Washing machine	88.9%	88.6%
Tumble dryer	53.1%	60.0%
Combined washing machine / tumble dryer	1.4%	1.3%
Small household appliances		
Sewing machine	46.3%	41.8%
Iron	95.7%	93.1%
Vacuum cleaner	95.7%	93.9%
Entertainment and communications devices		
Mobile phone	63.2%	94.2%
Fax	14.3%	10.6%
PC	48.8%	80.9%
Television	95.2%	95.9%
Video	74.8%	54.8%
DVD player	-	76.0%
Music system	77.9%	66.3%
CD player (including portable player) separate from a music system	37.1%	34.8%
Video camera	18.3%	18.7%
Digital camera	-	70.6%

Source: FPS Economy – Belgium statistics – Survey of household budgets 2001 & 2010

2.10. Agriculture and forestry [5]

Agriculture in Belgium, favoured by fertile soil and a temperate climate, is specialised in market garden and horticultural crops, cereals, potatoes, sugar beets, stock farming and milk production. Due to the short coastline, fishing has relatively limited importance as an economic activity. Although farmland covers most of Belgium, its surface area is shrinking (tab. 2.4) and giving way to buildings.

In 2011, there were 39 528 agricultural and horticultural businesses in Belgium (table 2.19). Wallonia has more agricultural land than Flanders (55% compared to 45%) but generates half the latter's added value (two-thirds of intensive farming holdings are situated in Flanders).

The active population employed in agriculture has been decreasing since the Second World War. Today, the active population in agriculture and fisheries represents barely 1% of the total population (compared to 21.5% in 1910). However, over the last 10 years (2001-2011), there has been a rise in the number of salaried employees in agriculture (+23.5% or 4 000 additional jobs). This is mainly explained by the regularisation of seasonal workers. A Royal Decree adopted in 2004 facilitated the hiring of seasonal workers, in particular by removing the cap on the number of days during which the agricultural and horticultural sector can use them and a reduction in the personnel costs in force for workers hired via temporary employment agencies. This regulatory provision, combined with increased checks and sanctions, has helped reduce undeclared work in the sector. Self-employed persons are still a much larger group than employees in this branch of economic activity: 45 000 compared with 19 600 in 2010. And yet between 2000 and 2010, the share of self-employed persons in the sector dropped by 8.7%. [2]

The major characteristic of the Belgian agricultural sector is the structural reduction of the number of farms which has led to a concentration of land. Over 30 years, from 1980 to 2010, the country lost 63% of its farms, with an equal rate of disappearance for both Flanders and Wallonia (-3.4% per year on average). Over the same period, the average surface area per farm has more than doubled.

Since 1987, the number of tractors and other agricultural equipment has risen spectacularly: + 22.9%.

In spite of the observed decline, agriculture and fisheries are still important economic sectors.

Since 1987, land used for organic farming has multiplied almost sixtyfold (59.7);

at the same time, the number of organic farms has increased almost thirteenfold (12.7) (figure 2.19). Distribution by type of farm shows that in Wallonia, the conversion mainly affects livestock farmers, while in Flanders it particularly concerns horticulture. All this is of course due to the different specialisations of the two regions.

We should also note the very high increase in the number of certified organic cattle, which has doubled in five years.

In 2010, the average surface area of an organic farm was 38.22 km^2 in the Flemish Region (compared to 4.17 km^2 in 1987) and 4 448.78 km^2 in the Walloon Region (compared to 5.83 km^2 in 1987).

The distribution of forests in Belgium is shown in table 2.20. Total forest area in Flanders amounted to 1 479 km^2 in 2010, while Walloon forests covered 5 563 km^2.

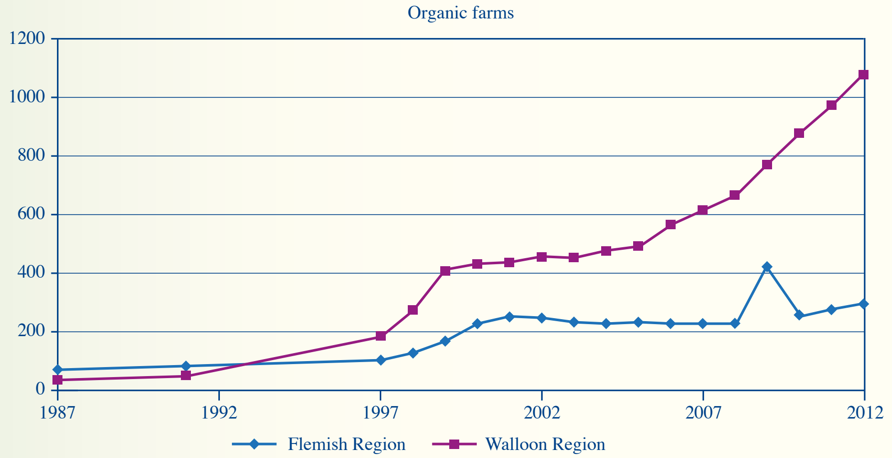
Table 2.19 Agricultural and horticultural census (2011)

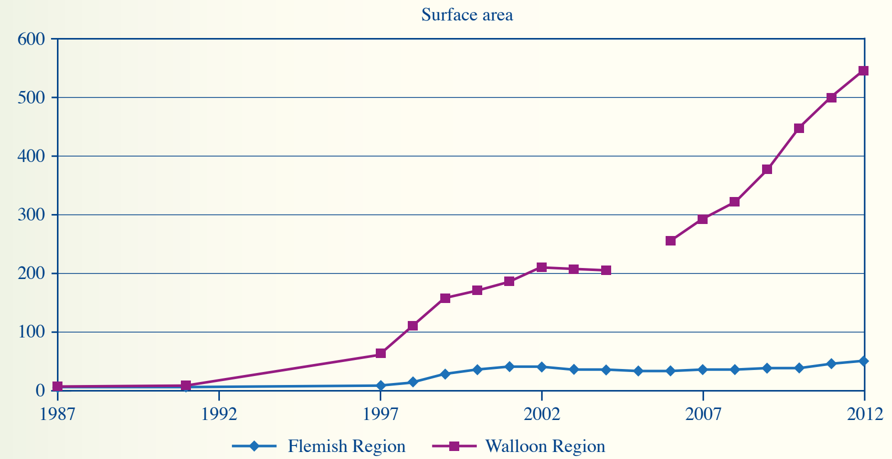
	2000	2011
Number of agricultural and horticultural businesses	61 705	39 528
Agricultural surface area in use (in km^2)	13 940.83	13 373.03
Workforce	107 399	74 399
Animals (in thousands)		
Number of cattle	3 042	2 560
- of which dairy cows	594	488
Pigs	7 369	6 521
Hens and chicks	15 232	12 292
Broil chickens	24 498	23 084
Crops (km^2)		
Cereals grown for seed	3 134.85	3 276.79
Sugar beets	908.58	621.99
Maize grown for seed	357.83	720.25
Potatoes (except seedlings) Energy crops - Biofuels	658.44	823.41 30.21 6.59

Source: FPS Economy Belgium statistics – Key figures for agriculture 2012 – Agricultural survey of May 2011 – final results (table A)

In order to simplify administrative procedures, the 2011 survey is no longer based on farmers who made a declaration in the agricultural census in 2010 but on the farmers who submitted a 'déclaration de superficie' (declaration of surface area) to the Walloon Region or a 'verzamelaanvraag' (single application) to the Flemish Region. This has implications for the number of farms making up our register. In a certain number of cases, a 'unit' of production, which we previously considered as a farm, is now included in a declaration made at a broader management level. The surface areas and livestock related to this old unit do not disappear in the results, but are accounted for with other declarations. The main consequence is thus a drop in the number of farms (or businesses) recorded in the register. This is an 'administrative' drop, which this year is added to trends in the disappearance and creation of businesses. 2011 is thus marked by a chronological break in the register of farms.

Figure 2.19 Number of organic farms and surface area (km²) for the 1987-2012 period in the Flemish Region and Walloon Region





Source: FPS Economy Belgium statistics

Table 2.20 Forest cover in Belgium (2010)

	Total area (km^2)	Forest area (km^2)		Forest cover (%)	% total forest area
		Forest	Other wooded land		
Wallonia	16 844	5 297	266	33.0	78.8
Flanders	13 522	1 464	15	10.9	21.0
Brussels-Capital	162	17	0	10.5	0.2
Belgium	30 528	6 778	281	23.1	100.0

Sources: FAO [20]

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3. Greenhouse gas inventory information

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Belgian Interregional Environment Agency

3.1. Summary tables

Inventory information presented in this chapter[9] is extracted from the 2013[10] submission following the UNFCCC recommendations (Annotated Outline for Fifth National Communications of Annex I Parties under the UNFCCC, including Reporting Elements under the Kyoto Protocol). This inventory includes emissions data for the years 1990 to 2011. The summary tables 10s1 to 10s4 (Common Reporting Format) from the national GHG inventory are reported in annex 2 of this report.

Table 3.1 Overview of GHG emissions and removals from 1990 to 2011 (in Gg CO_2-equivalent)[11]

	1990	1991
CO_2 emissions including net CO_2 from LULUCF	118 167	120 898
CO_2 emissions excluding net CO_2 from LULUCF	119 094	121 552
CH_4 emissions including CH_4 from LULUCF	9 708	9 524
CH_4 emissions excluding CH_4 from LULUCF	9 708	9 523
N_2O emissions including N_2O from LULUCF	10 890	10 768
N_2O emissions excluding N_2O from LULUCF	10 877	10 750
HFCs	NA,NO	NA,NO
PFCs	1 753	1 678
SF_6	1 662	1 576
Total (including LULUCF)	**142 181**	**144 444**
Total (excluding LULUCF)	**143 095**	**145 080**

[9] Expressed as CO_2 equivalents, i.e. taking into account the overall warming effect of each of the gases, which is used to evaluate the relative contribution to global warming of the emission in the atmosphere of a kg of specific greenhouse gas, as opposed to the emission of a kg of CO_2 and taking into account their life spans and their respective radiation powers (CO_2= 1, CH_4 = 21 et N_2O = 310). A kg of CH_4 therefore has the same effect as 21kg of CO_2 over a 100 year period.

[10] The data correspond to the submission of April. Some differences due to recalculations appear with the resubmission of November.

[11] The base year emissions used to calculate the Kyoto objective are 145 728.763 Gg CO_2 eq (1990 and 1995 figures approved when the inventory was verified in 2007). The current figures in table 3.1 present minor corrections to this data.

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
119 065	118 138	122 594	123 675	127 906	122 007	128 353	122 797	124 520	124 313	123 572	126 707	127 523	124 251	120 475	116 127	119 226	106 845	113 422	103 028
120 015	119 018	123 500	124 422	128 452	122 821	129 066	123 545	125 250	125 222	124 971	128 161	128 864	125 611	121 800	117 436	120 533	108 254	114 873	104 467
9 380	9 271	9 242	9 274	9 057	8 899	8 757	8 623	8 290	7 954	7 540	7 076	6 998	6 796	6 705	6 688	6 533	6 448	6 508	6 352
9 380	9 271	9 242	9 274	9 034	8 899	8 756	8 623	8 290	7 954	7 540	7 076	6 998	6 796	6 705	6 688	6 533	6 448	6 508	6 346
10 404	10 701	11 266	11 749	12 337	11 793	11 929	11 825	11 084	10 854	10 357	9 299	9 494	9 227	8 277	7 622	7 547	7 759	8 362	7 232
10 383	10 676	11 238	11 720	12 073	11 754	11 885	11 780	11 036	10 802	10 300	9 238	9 432	9 160	8 207	7 546	7 465	7 671	8 268	7 068
445	445	451	452	540	650	786	815	943	1 071	1 290	1 442	1 479	1 462	1 559	1 739	1 822	1 883	1 936	1 996
1 830	1 759	2 113	2 335	2 217	1 211	669	348	361	223	82	209	307	154	159	180	202	116	85	179
1 744	1 677	2 035	2 205	2 121	526	271	116	112	129	112	100	84	86	75	81	91	97	111	116
142 867	**141 990**	**147 701**	**149 690**	**154 178**	**145 087**	**150 766**	**144 525**	**145 310**	**144 544**	**142 953**	**144 833**	**145 886**	**141 975**	**137 250**	**132 437**	**135 421**	**123 147**	**130 425**	**118 903**
143 796	**142 844**	**148 578**	**150 408**	**154 437**	**145 862**	**151 434**	**145 228**	**145 992**	**145 401**	**144 295**	**146 226**	**147 165**	**143 269**	**138 505**	**133 670**	**136 645**	**124 468**	**131 782**	**120 172**

Table 3.2 Overview of GHG emissions and removals in the main sectors from 1990 to 2011 (in Gg CO_2-equivalent)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Energy	112 375	115 174	113 664	112 733	115 918	116 461	121 251	115 197	121 371	115 551	116 994	117 511	116 156	119 398
Energy Industries	29 990	29 930	28 767	28 235	30 016	29 422	29 244	28 109	30 839	27 128	28 528	27 005	28 502	29 622
Manufacturing Industries and Construction	32 793	32 700	31 893	30 786	32 204	32 658	31 961	31 155	33 614	32 164	33 331	32 512	31 237	30 654
Transport	20 815	21 003	21 757	22 278	22 780	22 894	23 343	23 535	24 223	24 575	24 869	25 479	25 782	26 339
Residential, Commercial and Agriculture	27 672	30 561	30 405	30 555	30 135	30 754	35 994	31 709	32 022	31 000	29 541	31 811	29 951	32 162
Other Combustion	163	163	163	162	162	105	89	97	94	94	94	96	95	93
Fugitive Emissions from Fuels	942	817	679	718	621	628	619	591	579	589	631	607	589	528
2. Industrial Processes	15 776	15 103	15 382	15 474	18 015	19 223	18 854	16 386	15 898	15 550	15 658	14 934	15 365	14 782
3. Solvent and Other Product Use	213	210	209	207	204	200	199	199	198	197	214	213	213	213
4. Agriculture	11 317	11 182	11 103	11 203	11 206	11 391	11 165	11 121	11 145	11 210	10 529	10 409	10 187	9 712
5. Land Use, Land-Use Change and Forestry	-914	-636	-930	-854	-877	-718	-259	-775	-668	-703	-682	-857	-1 342	-1 393
6. Waste	3 413	3 411	3 438	3 227	3 235	3 132	2 966	2 959	2 821	2 720	2 597	2 334	2 374	2 122
Total (includ. LULUCF)	**142 181**	**144 444**	**142 867**	**141 990**	**147 701**	**149 690**	**154 178**	**145 087**	**150 766**	**144 525**	**145 310**	**144 544**	**142 953**	**144 833**

2004	2005	2006	2007	2008	2009	2010	2011
119 786	116 235	112 411	108 102	111 418	101 935	108 156	97 698
29 778	29 427	27 934	27 436	25 470	25 911	26 435	22 049
30 674	28 868	29 022	27 820	28 369	19 980	23 626	23 565
27 334	26 354	25 771	25 653	27 975	27 230	27 128	27 047
31 394	30 962	29 037	26 588	29 026	28 241	30 369	24 486
93	93	93	69	62	56	48	50
514	531	554	536	515	516	549	501
15 359	15 320	14 542	13 955	13 889	11 231	12 220	11 283
213	212	212	212	212	212	211	211
9 662	9 450	9 325	9 397	9 259	9 359	9 427	9 366
-1 279	-1 294	-1 255	-1 233	-1 225	-1 321	-1 357	-1 268
2 145	2 051	2 015	2 004	1 868	1 731	1 769	1 613
145 886	**141 975**	**137 250**	**132 437**	**135 421**	**123 147**	**130 425**	**118 903**

3.2. Analysis of trends

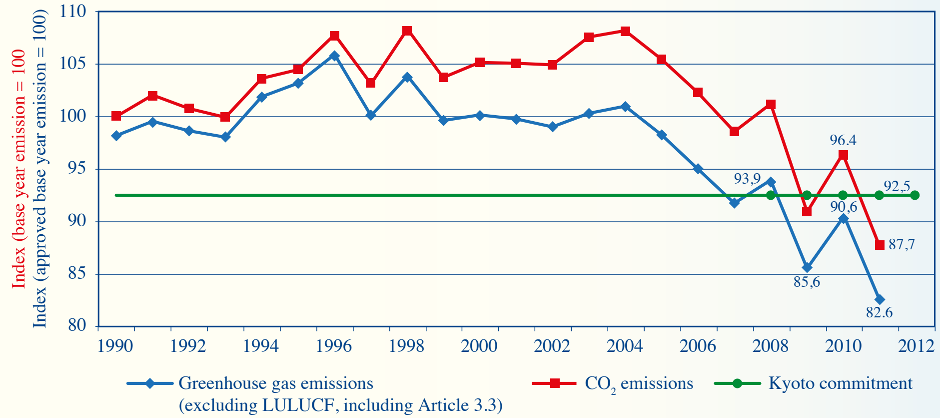
3.2.1. General trends

Total greenhouse gas emissions (without LULUCF) in Belgium amounted to 120.2 Mt CO_2 eq. in 2011 and to 120.4 Mt CO_2 eq. including KP-LULUCF article 3.3.[12] They dropped by 17.4% in 2011 compared to the base year emissions (figure 3.1).

Under the Kyoto Protocol and the EU 'burden sharing' agreement, Belgium is committed to reducing its GHG emissions by 7.5%. Because of the economic crisis experienced since 2009, Belgium still

[12] Belgium has not elected grassland and cropland management under Article 3.4 for inclusion in its accounting for the first commitment period.

Figure 3.1 Belgian GHG emissions between 1990 and 2011 (excluding LULUCF but including article 3.3) compared with the Kyoto objective



For fluorinated gases, the assumed base year is 1995, so the index value 100 on the Y-axis corresponds to CO_2, CH_4 and N_2O emissions in 1990 and HFC, PFC and SF_6 emissions in 1995 as approved by the review in 2007 of the initial report of Belgium under the KP (blue line).

complies with its commitments for the first four years of the commitment period despite the rise in emissions in 2010. Taking into account the first four years of the commitment period, Belgium has reduced its emissions (expressed on an annual basis) by 11.8%.

The major greenhouse gas in Belgium is carbon dioxide (CO_2), which accounted for 86.9% of total GHG emissions in 2011. Methane (CH_4) accounts for 5.3%, nitrous oxide (N_2O) for 5.9%, and fluorinated gases for 1.9% (figure 3.2). Emissions of CO_2 decreased by 12.3% from 1990 to 2011, while CH_4, N_2O and fluorinated gas emissions dropped respectively 34.6%, 35.2% and 54.1%[13] during the same period.

An overview of the contribution of the main sectors to Belgium greenhouse gas emissions is given in figure 3.3. Manufacturing industry, energy industries, transport and space heating (residential) are the most important sectors in the total GHG emissions in 2011.

Figure 3.4 summarises the impact of the main sectors on the national trend. It clearly shows the sharp increase in road transport on the one hand but also the increase of emissions from buildings in the commercial sector on the other hand. In 2011, the residential sector experienced a decline (emissions from the residential sector depend more heavily on winter weather and 2011 was a relatively warm year). Since 1990, those two sectors together grew by 28.3% and were responsible for a 5.0% increase in total emissions.

This trend is counterbalanced by the 21.0% decrease in emissions in the other sectors, particularly industry (combus-

[13] compared to 1995 emissions

Figure 3.2 Share of greenhouse gases in Belgium (2011)

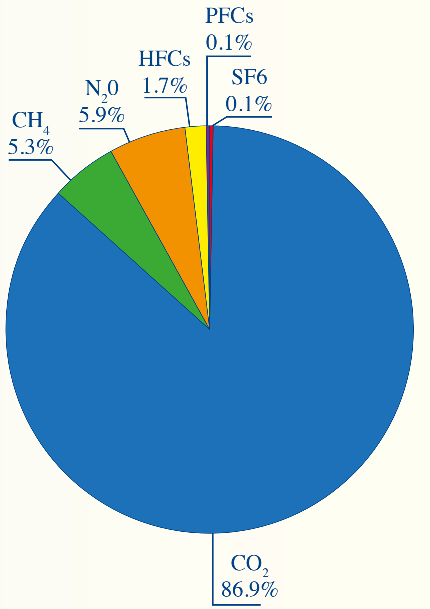
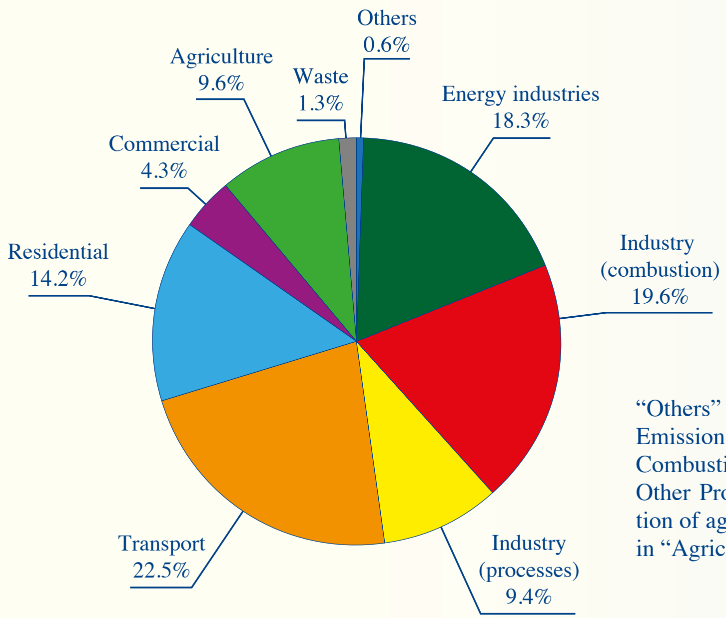


Figure 3.3 Share of the main sectors in 2011



“Others” includes “Fugitive Emissions from Fuels”, “Other Combustion” and “Solvent and Other Product Use”. Combustion of agriculture are included in “Agriculture” sector.

tions recorded a 6.4% decrease in total emissions), giving an overall decrease of -16.0% compared to 1990 (for all gases).

The drivers of these trends are analysed and commented on the following pages, sector by sector.

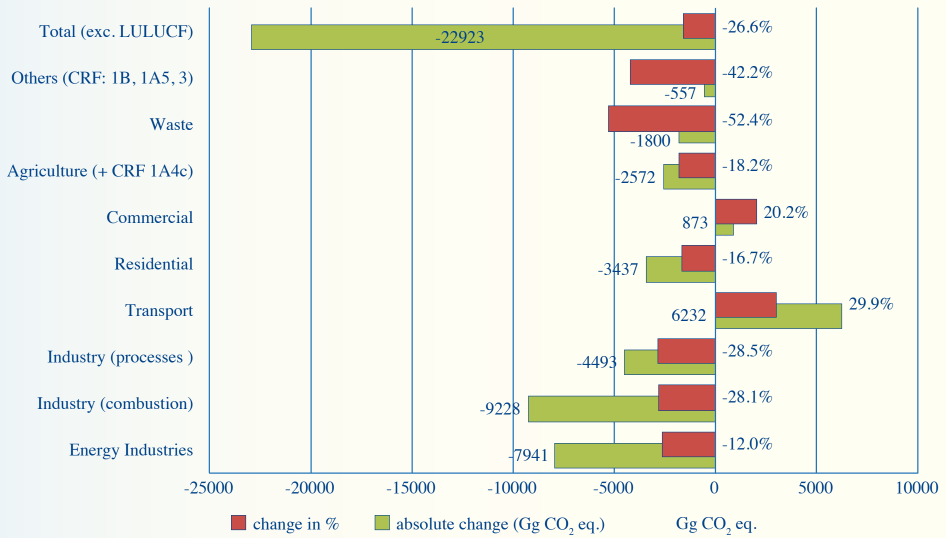
3.2.2. Energy production

The main source for this sector is public electricity and heat generation, which accounted for 79% of sectoral emissions in 2011. Petroleum refining and manufacture of solid fuels accounted for 20% and 1% respectively.

Emissions from the manufacturing of solid fuels have decreased by 88% since 1990 (-1783 Gg CO_2 equivalent) due to the closure of six coke plants in respectively 1993, 1995, 1997, 2000, 2005 and 2010. Emissions in 2011 from petroleum refining are about on the same level as in 1990. Emissions in this sector can fluctuate depending on the general economic context and planned shut-down for inspection, - maintenance- and renovation works. This was the case in 2011 for one of the refineries.

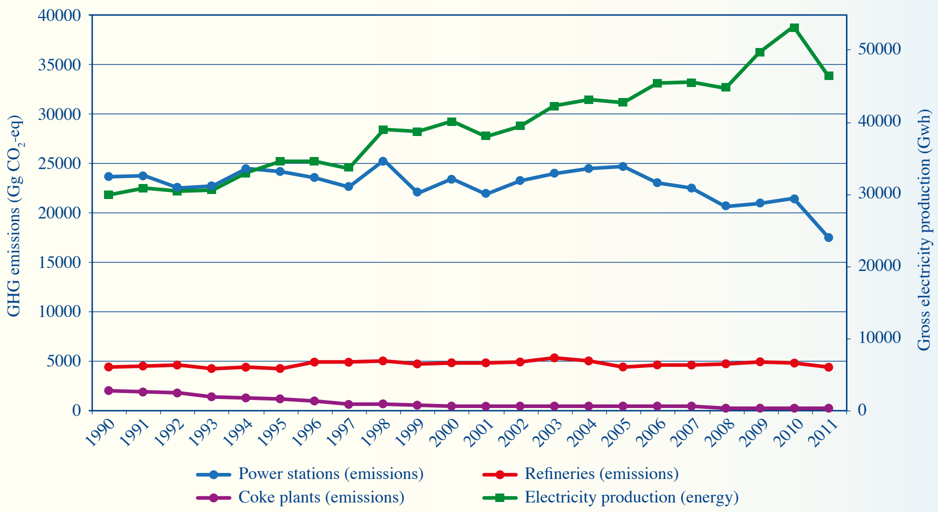
As mentioned above, the main driver in this sector is public electricity and heat generation. While electricity and heat production rose by 55% between 1990 and 2011 [1], emissions slightly decreased (-26%) due to technological improvements, increase in the number of combined heat-power installations and the switch from solid fuels (coal) to gaseous fuels (natural gas) and renewable fuels. This is illustrated in figure 3.5.

Figure 3.4 Impact of the main sectors on the global trend 1990-2011 (Gg CO_2 eq.)



“Others” includes “Fugitive Emissions from Fuels”, “Other Combustion” and “Solvent and Other Product Use”. Combustion of agriculture are included in “Agriculture” sector.

Figure 3.5 GHG emissions from public electricity and heat generation, in relation to gross electricity generation (excluding nuclear) [1]



3.2.3. Manufacturing industries

In 2011 in the manufacturing industries, added value[14] [3] increased by 23% over the 1990 level, while greenhouse gas emissions decreased by 28% in the same period (only the energy part of the emissions is considered here).

As seen in figure 3.6, fuel energy consumption decreased by 14% between 1990 and 2011 (and by 25% if we consider 2009). This strong decrease is obviously due to the impact of the economic crisis in the iron and steel sector. The apparent **decoupling of added value and energy consumption** can be attributed to various drivers depending on the sector:

- In the iron and steel industry, many plants have switched to electric furnaces since 1990. For example, electricity consumption by the sector increased by 28% from 1990 to 2002 [2]. This is the main cause of the apparent drop in energy consumption, while stable added value is observed in this sector. This sector still represents 24% of the energy consumption in 2011 by the manufacturing industries and consequently has a significant impact on the global trend.
- In the chemical sector, fuel consumption increased by 47% between 1990 and 2006, compared to 65% growth in added value [2]. This relative decoupling is linked to both rational energy use and high added-value products. In 2011, this sector represents 34% of energy consumption in the manufacturing industries.
- Food processing and beverages represented 7% of energy consumption in the manufacturing industries in 2006, but 13 to 14% of added value [2]. This sector shows the steepest increase in added value compared to energy consumption. The diversity of the plants in this sector does not allow a detailed analysis of the trend; only certain types of plants are commented upon here. In sugar plants, for example, some products with high added value, such as inulin and fructose,

[14] Gross added value of "manufacturing industries", estimates in "chained euros" (reference year 2005) - FPB

Figure 3.6 Manufacturing industries: index of GHG emissions, energy consumption and added value [2]

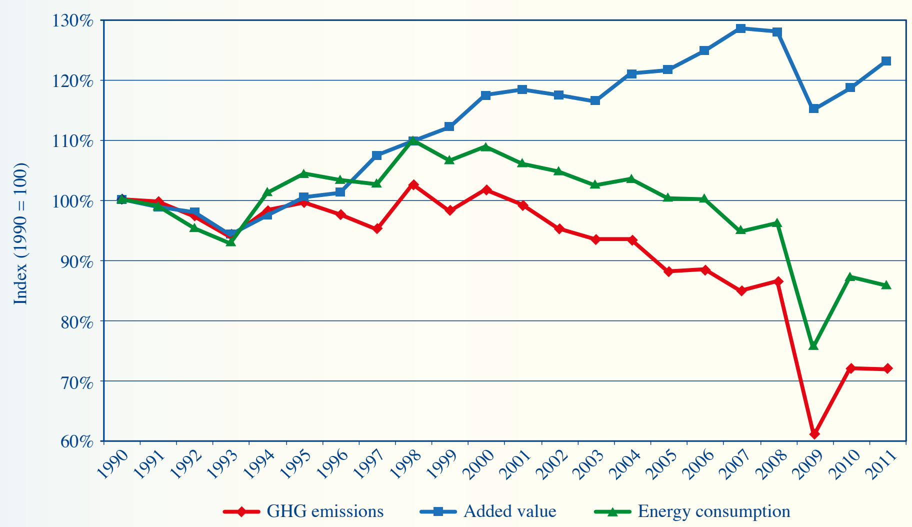
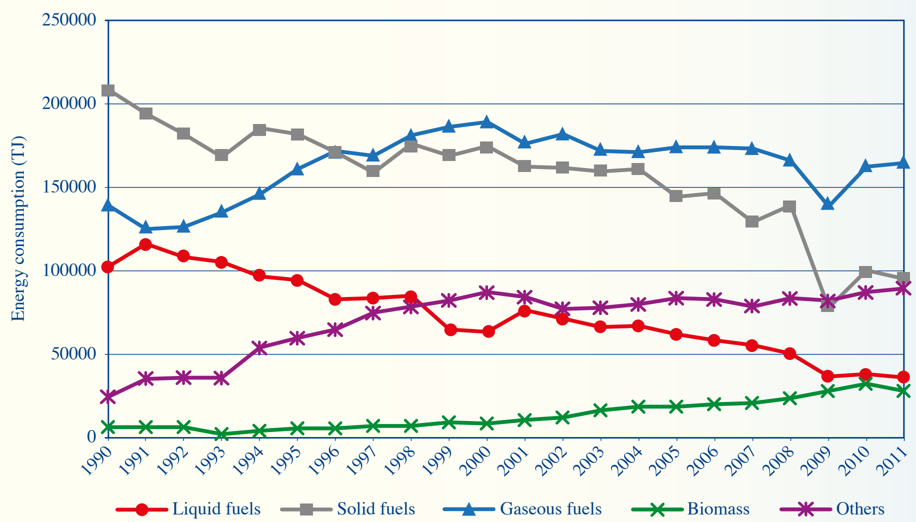


Figure 3.7 Type of fuels used in the manufacturing industries



have been developed recently, but the main driver is still the sugar beet yield (quantity and sugar content), which is highly climate–dependent.

– In cement plants, the decoupling between energy consumption and total production is linked to the production process: the dry process, which is considerably less energy-demanding, is gradually replacing the wet process and in 2010 was 71% of clinkers production compared to 61% in 1990.

Figure 3.6 also shows a **decrease in greenhouse gas emissions for an equal level of energy consumption.** One reason is the increasing use of gaseous fuels, coupled with a decrease in liquid and solid fuels observed across all sectors. This is illustrated in figure 3.7.

The increasing use of 'other fuels' reflects on the one hand the growing numbers of naphtha crackers and the enlargement of existing plants. In addition, cement plants have been using more and more substitute fuels since 1990, such as impregnated sawmills, animal waste, tyres, etc. Those fuels represented 47% of their energy consumption in 2011, compared to 8% in 1990. The non-biomass fraction of these fuels is included in the "other fuels" category. The biomass fraction of these fuels is included in biomass fuels and not accounted for in the national emissions. Cement plants account for a doubling of the use of biomass fuels since 1990, with a particularly steep increase since 2001, when the 'dioxin crisis' in Belgium resulted in the elimination of high levels of poultry and animal meal in cement kilns. The other half of the biomass fuels used in Belgium comes from the pulp and paper sector, where part of the woody raw material has always been used as fuel in pulp paper plants.

3.2.4. Industrial processes

The 'industrial processes and F-gases' sector covers the emissions from industrial activity, that do not result from fossil fuel combustion. In 2011, these emissions of greenhouse gases were mainly caused by mineral products (45% of emissions of which 40% just for cement and lime production) and the chemical industry (30% of emissions of which 15% just for nitric acid and ammonia production). Fluorinated gases accounted for 20% of total emissions in this sector while metal production only represents 5% (sharply down from 2009 due to the economic crisis).

3.2.4.1 Mineral products

These emissions are generated during the decarbonation of calcium carbonates. They are closely linked to production levels of cement and lime, which on the whole are stable.

3.2.4.2 Chemicals

Despite the closure of two nitric acid plants (one in 1995 and another in 2000), the production of nitric acid in the two remaining plants increased by 43% in 2011 compared with 1990 (after a sharp decline in 2009). In parallel, these plants have taken measures to reduce emissions from their processes (use of catalysts since 2003 with a drop in the emissions in 2011 due to the placement of new catalysts on two installations at the end of 2010). However this is partly counterbalanced by an increase in CO_2 emission from other products.

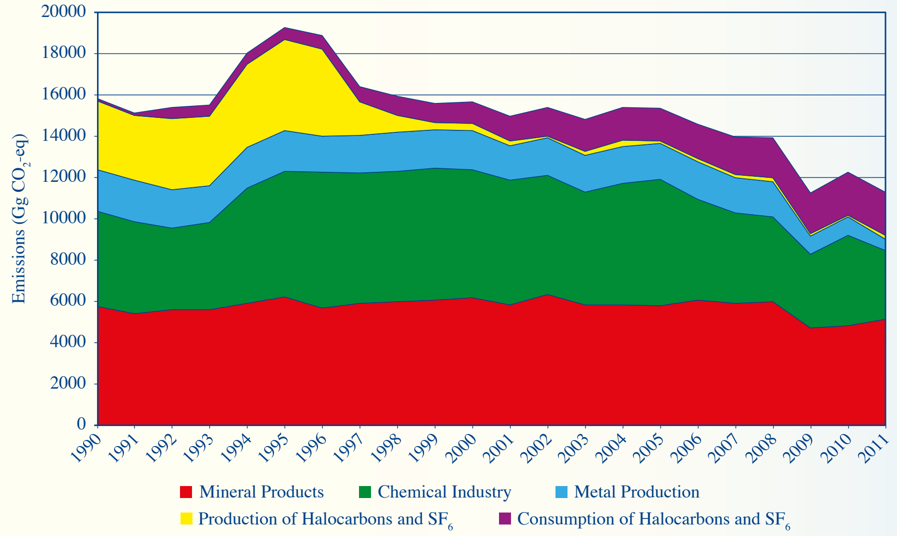
3.2.4.3 Metal production

In the iron and steel sector, greenhouse gas emissions decreased by 73% in 2011 compared to 1990. This is consistent with the economic crisis that hit the iron and steel sector in 2009, with a decrease in activity of almost 50% in all sub-sectors.

3.2.4.4 Fluorinated gases

Emissions of fluorinated gases accounted for 1.91% of total greenhouse gas emissions in 2011. A distinction is made between 'production emissions', which are fugitive emissions during the production process, and 'consumption emissions', which are those occurring during the use or dismantling of existing equipment and products.

Figure 3.8 Greenhouse gas emissions in the industrial processes sector



The sharp decrease in emissions from the production of HFC between 1996 and 1999 (figure 3.8) was due to the installation of a gas incinerator with an HF recovery unit (Fluoride Recuperation Unit) in the most important source identified, an electrochemical synthesis unit.

The growing consumption of HFC (figure 3.9) is directly linked to the implementation of the Montreal Protocol and EU Regulation 2037/2000, which ban the use of ozone-depleting substances like CFCs. The CFCs formerly used are now replaced by HFCs in most sectors such as refrigerating and air conditioning installations, production of isolating foams and some aerosols. The quantities of HFCs are nonetheless lower than those of CFCs because in many cases CFCs have been replaced by non-fluorinated gases, like ammonia in refrigeration, pentane and CO_2 for isolating foams, etc.

SF_6 emissions originating from the production of acoustic double-glazing have been cut through the use of alternate products. Nevertheless, SF_6 consumption emissions are likely to increase in the coming years due to the dismantling of existing equipment.

3.2.5. Residential and commercial

In the residential sector, fuel consumption rose by 12% between 1990 and 1999. This is mainly linked to the increasing number of dwellings (+13% between 1991 and 2001 since these two years were very similar from a climatic point of view). Annual fluctuations are of course climate-related. Degree days[15] are one of the key parameters used to analyse the sector's energy consumption. This is particularly clear for 1996 and 2010 which were cold years with a marked peak of emissions from heating. The same came be said for 2006 and 2007, two years with exceptionally mild winters, which showed a sharp drop in consumption. Recently, the rising energy prices together with improvements to buildings for greater energy efficiency have probably also helped reduce consumption.

Since 1990, gaseous fuels consumption has increased from 34 to 48% of total energy consumption (without electricity and heat), together with a decrease in solid fuels and liquid fuels. Liquid fuels still account for 47%, however. One explanation could be that the gas distribution network does not cover sparsely populated areas, thus hampering the switch from liquid to gaseous fuels, which is observed in other sectors.

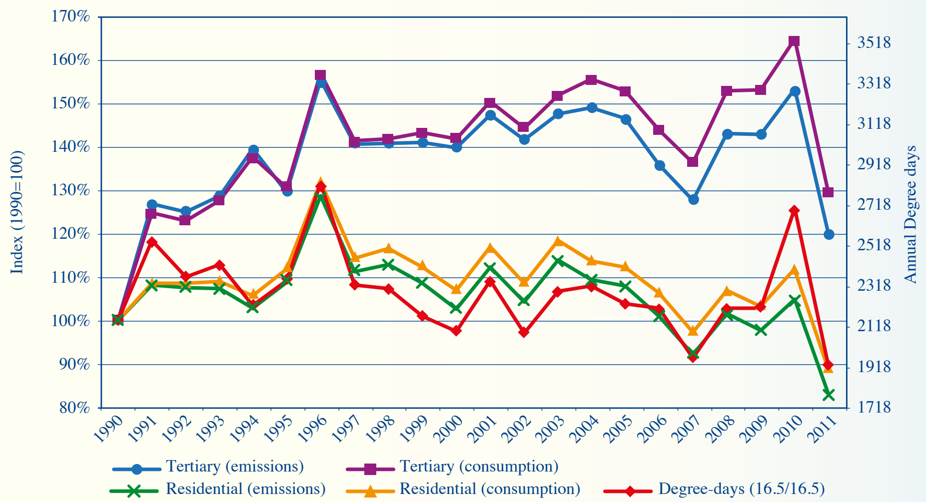
In the commercial and institutional sector, fuel consumption has increased by 30% since 1990 (65% if we look at 2010). Annual fluctuations are also climate-related but the overall trend is less affected than in the residential sector. One reason is the growing number of employees, which rose by 27% from 1993 to 2010. A clear switch from liquid fuels to gaseous fuels has been observed since 1995 and gaseous fuels now represent 73% of the sector's energy consumption (without electricity and heat). In the meantime, electricity consumption has also grown by 96%, mainly due to the development of Information Technologies and the increased use of refrigerated areas and air conditioning. The emissions from this final consumption of electricity are included in the energy sector emissions.

These increases have been partially counterbalanced by the replacement of fuel oil by natural gas observed since 1995. Natural gas accounts for close to 73% of the sector's energy consumption and explains the relative drop in emissions compared to energy consumed (figure 3.9).

For both sectors, other fuels and biomass remain negligible for the time being. In the commercial sector, a slow increase has been observed since 1998, but biomass represents only 0.8% of the sector's energy consumption. In the residential sector, biomass represents 3.2%.

[15] Degree day: the difference expressed in degrees centigrade between the average daytime temperature and a base temperature (15°C for the 15/15 base and 16.5°C for the 16.5/16.5 base). Average temperatures that are higher than the base temperature are not included. The total number of degree days over a given period (month or year, for example) are added together. Degree days enable heating requirements to be assessed.

Figure 3.9 Residential and commercial sector GHG emissions



3.2.6. Transport

Transport emissions accounted for 14.5% of total GHG emissions in 1990 and 22.5% in 2011. This increasing share is due to road transport, which represents 97.6% of total emissions by the sector in 2011 (without CRF 1.AA.3.E sector "other transportation").

Emissions from domestic navigation are fairly stable and represented 2% of transport total emissions in 2011. Emissions from railways (0.4% in 2011) seem to have decreased since 1990, but in fact this reflects the switch from diesel to electrical engines, as electrical consumption emissions were classed in the electricity generation sector.

In the road transport sector, most indicators are on the rise: the number of vehicles has increased by 49% since 1990 (40% for passengers cars) [4], together with traffic (vehicle km) which in the meantime hes risen by 41% [5]. During the same period, road freight traffic grew by 82% while the private vehicule occupancy rate increased by only 30% [5].

There is a marked switch from petrol engines to diesel. The number of petrol engines (all vehicles) dropped between 1990 and 2011 (-17%), while the number of diesel engines almost tripled (+ 190%) for the same period. This is reflected in their respective traffic figures (- 50% for petrol engines and +300% for diesel engines [5]) as well as in their respective emissions (figure 3.11 and 3.10). Although to produce the same quantity of energy diesel emits 7% more CO_2 than gasoline, the average consumption of a diesel engine is about 12% less, so on the whole a diesel car emits less GHG by km than a gasoline car.

The average engine capacity has also grown since 1995, reflecting both the switch to diesel and the growing success of Sport Utility Vehicles and Multi-Purpose Vehicles. The average age of cars has increased (improved rust protection and overall resistance), as has the average distance travelled which is now being stabilized.

The number of vehicles using LPG increased by 93% between 1990 and 2002

Figure 3.10 Road transport emissions (according "reference approach")

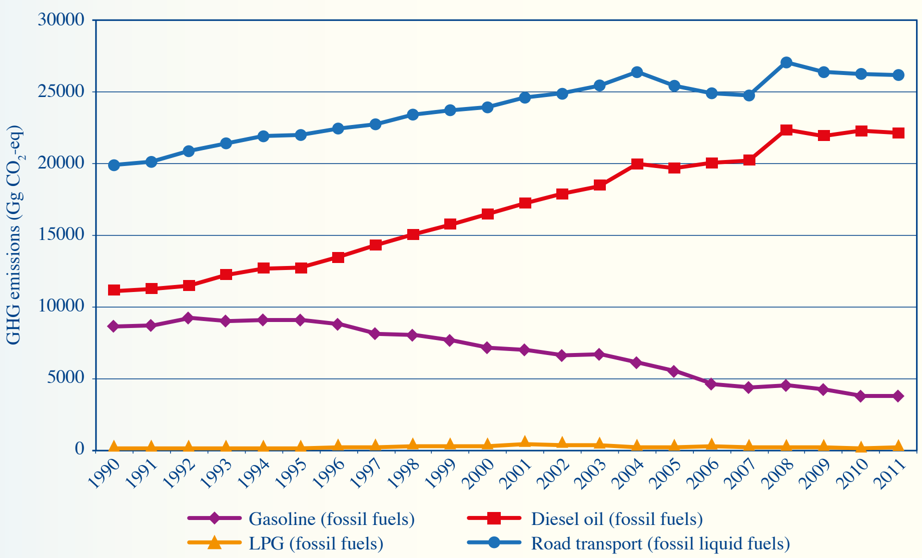
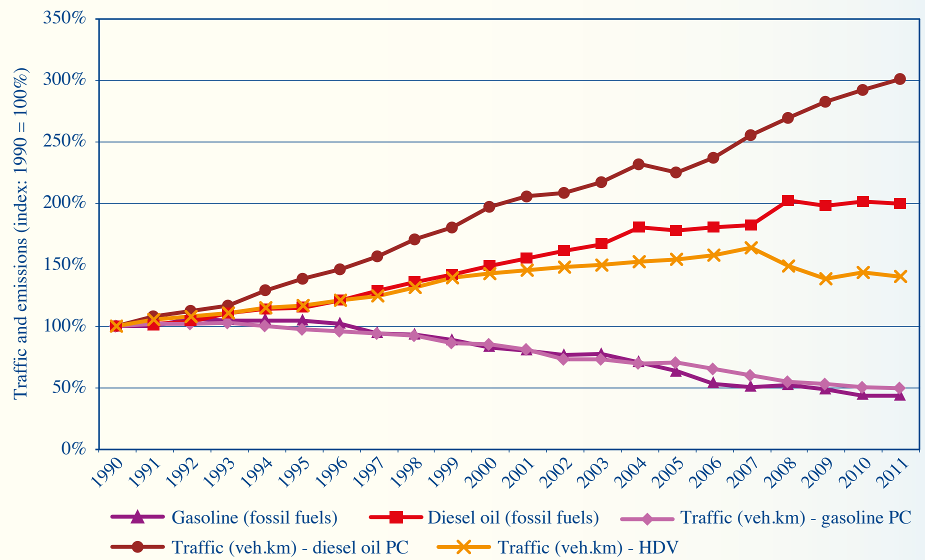


Figure 3.11 Road transport emissions and traffic figures



and then decreased by 47% and in 2011 represented a growth of only 2% over 1990. Progress attained during the early 2000s (thanks to subsidies and best price) have now completely disappeared. Private cars using LPG represented only 0.6% of private cars in 2011 whereas it was 1.6% in 1987.

In Belgium road transport is one of the key sources of greenhouse gas emissions, in terms of level and trend analysis. With an increase of GHG emissions by 30% between 1990 and 2011, it constitutes one of the main drivers of emissions trends. The absolute increase in CO_2 emissions from road transport between 1990 and 2011 is the second highest among the key sources for the trend assessment (+6380 Gg CO_2 eq.).

International air and maritime transport

In accordance with the UNFCCC guidelines, emissions from international air and maritime transport are not included in national emissions. In 2011, these emissions represented 25% of national emissions, with maritime transport representing the largest source (86% of this category). Emissions from international aviation have increased by 38% since 1990, while emissions from maritime transport have risen by 90% (going down from 2009 due to economic crisis and having a revival in 2011).

3.2.7. Agriculture

GHG emissions from agriculture (without fuels used) in 2011 accounted for 7.1% of the total emissions in Belgium. Overall (including emissions from energy sector CRF 1A4c), they decreased by 18.2% between 1990 and 2011.

37.2% of these emissions (without fuel used) are CH_4 emissions from enteric fermentation in 2011, cattle are responsible for 93% of these emissions. As can be seen in figure 3.12 those emissions decreased by 14% over 1990. This is mainly due to a general livestock reduction, but also to the shift from dairy cattle to brood cattle (which is a general EU trend linked to the Common Agriculture Policy), the latter generating less emissions.

In 2011 14.8% of the emissions were CH_4 from manure management with swine accounting for the biggest part (77%). These emissions are driven by the livestock: the swine livestock grew from 1990 until 1999 and has receded since then. Its impact on the emissions has been smoothed by the cattle livestock evolution explained above.

Figure 3.12 Emissions trends in the agricultural sector

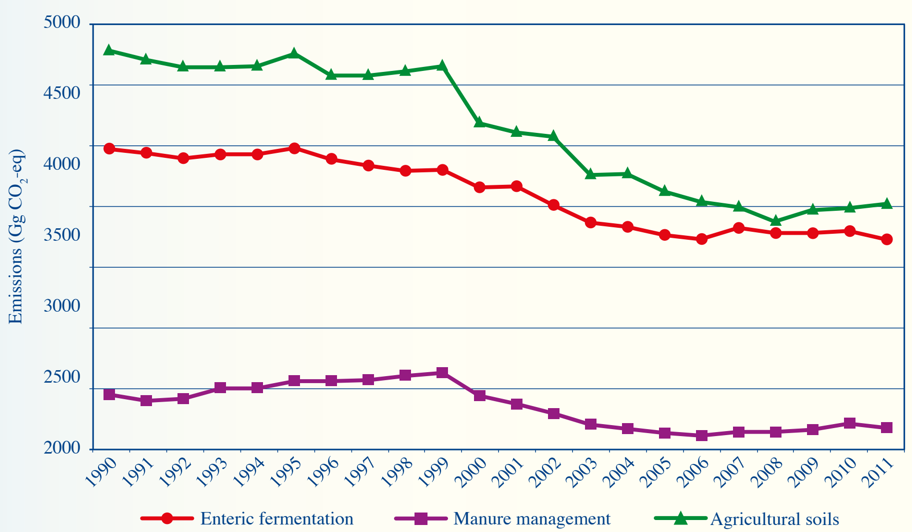
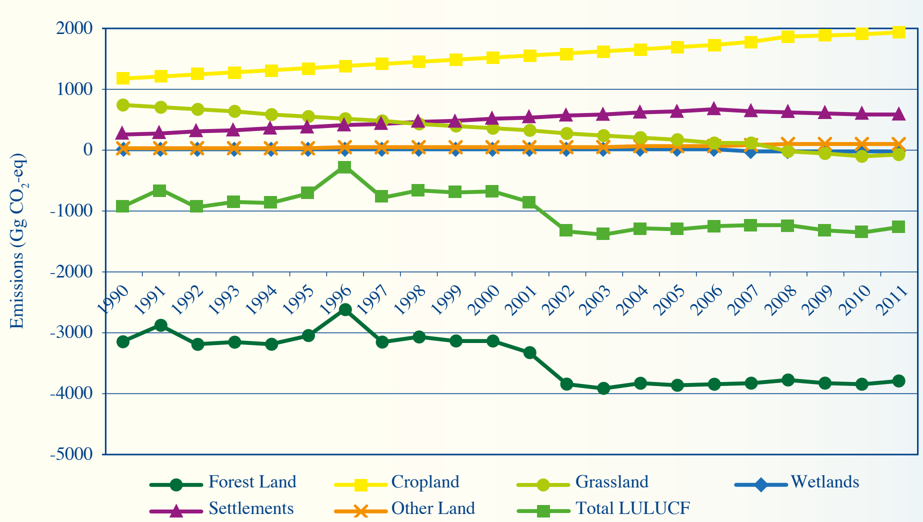


Figure 3.13 Emissions and removals trends in LULUCF sector



39.3% of emissions in agriculture originate from N_2O emissions from soil. They have decreased by 23%, due to the smaller quantities of nitrogen from mineral fertiliser applied and to livestock reduction (nitrogen excreted on pastures). Both reductions also have an impact on indirect emissions.

3.2.8. Land-use, land-use change and forestry

The methodology used to estimate carbon emissions and removals by LULUCF activities is explained in the NIR.

As seen in figure 3.13, in Belgium forests are a major carbon sink rather stable over time while all other sectors are sources (except grassland and wetlands over recent years).

Croplands continually show an increase in carbon emissions (64% since 1990) mainly due to the conversion of other land to this sector. In contrast, grasslands emissions decreased continuously to such an extent that since 2008 they have become a slight carbon sink. The conversion of other lands is another explaination. Settlements grew steadily since 1990 (18% growth between 1990 and 2011), which of course only increased urbanized areas, this explaining this growth. The other lands category has seen continued growth in emissions, but remains at a low level (+107 Gg CO_2 eq. in 2011) while wetlands emissions have dropped, to become a very small carbon sink since 2007.

Figure 3.14 Emission and removal trends in LULUCF compartments

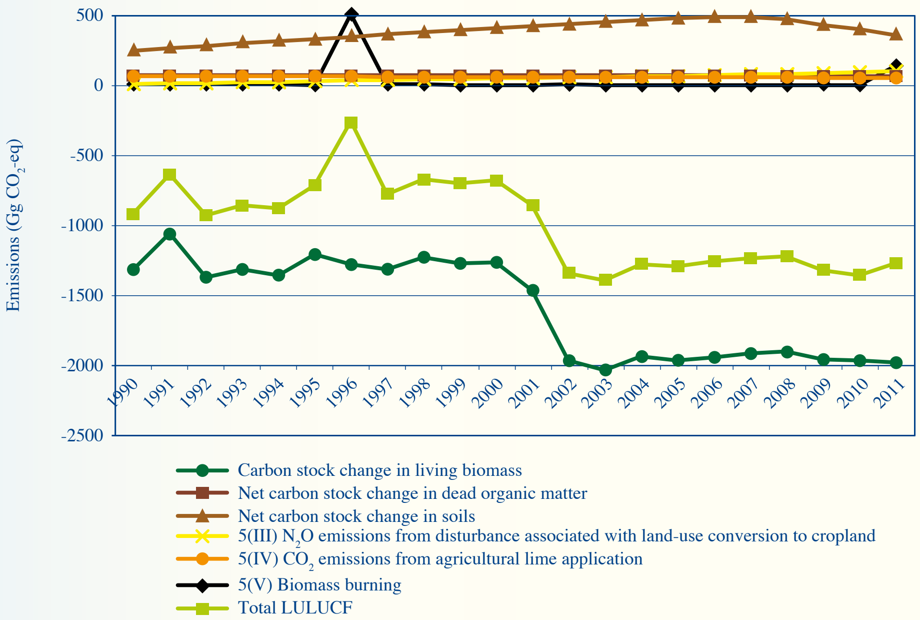
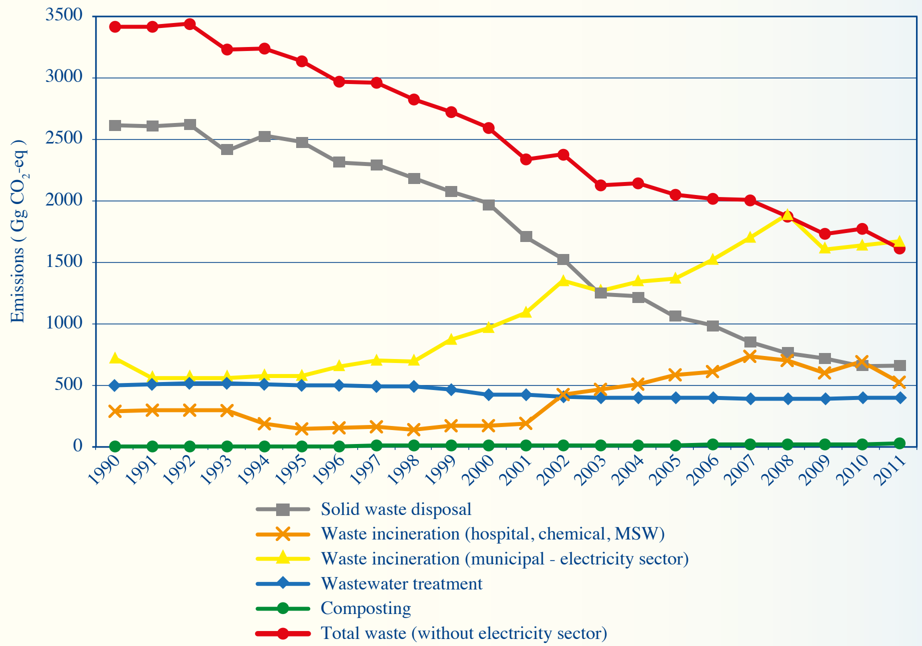


Figure 3.15 Emissions in the waste sector



Emissions from household waste incinerators have been included under electricity generation in accordance with the IPCC guidelines but are presented here in order to give a complete overview of waste-policy related emissions.

The result of these evolutions generates negative net emissions fairly stable for the whole LULUCF in Belgium, in the range of -1000 Gg CO_2 eq. (-1268 Gg CO_2 eq. in 2011).

Emissions of N_2O and CH_4 (only sources) represent only 2-3% of total sector sources (except in 1996 with 12.2% and 2011 with 6.7% due to large forest fires).

If we look at the compartments rather than sub-sectors (see figure 3.14), we find there is an accumulation of carbon in living biomass relatively stable since 2002 and linked to the forest. This sink is partially offset by emissions from soil carbon mainly related to land conversions to settlements and croplands. Emissions from biomass burning "5(V)" were significant only in 1996 (+504 Gg CO_2 eq.) and 2011 (+138 Gg CO_2 eq.)

Net CO_2 removals in the 2008-2011 period represented about 1% of total GHG emissions. Due to the accounting rules of the Kyoto Protocol,[16] however, Belgium records a net emission of about 220 Gg CO_2-eq. (annual average over the 2008-2011 period).

3.2.9. Waste

GHG emissions from waste[17] accounted for 1.3% of total national emissions in 2011, compared to 2.4% in 1990. This decrease is mainly due to CH_4 emissions from solid waste disposal on land, which represented 41% of total emissions from the waste sector in 2011. Biogas recovery in landfills by flaring or for energy purposes - depending on the richness of the landfill gas - has been developed on a wide scale since 1990 and is the main driver of the trend in this sector. Emissions in solid waste disposal on land dropped by 75% in 2011 over 1990.

The remaining 59% of GHG emissions stems from three sources: waste incineration, wastewater handling and composting. Emissions from waste incineration in this sector mainly covers flaring (and after-combustion) activities in the chemical industry while emissions of municipal waste incineration without energy recuperation decreased largely, down to roughly 10 Gg CO_2 equivalent in 2011. In accordance with the IPCC guidelines hospital waste is also included until 2004. Emissions of municipal waste incineration are thus mainly allocated in the energy sector as almost all the municipal waste incineration plants are also electricity producers (with the exception of some plants in the early nineties). However, the non-biogenic CO_2 emissions from the municipal solid waste incineration with energy recovery are added in fig 3.15 to give a complete overview of the greenhouse gas emissions of the waste sector.

3.3. National inventory system

3.3.1. Overall responsibility for the Belgian national inventory

The agency designated as the "single national entity with overall responsibility for the national inventory" (national compiler) is the Belgian Interregional Environmental Agency CELINE-IRCEL, established by the Cooperation agreement of 18 May 1994 (modified by the decision of 21 May 1995) about the monitoring of emissions in the atmosphere and the structuring of data. It is constituted by members of the three regions.

3.3.2. Legal arrangements and regional agencies

3.3.2.1 Legal arrangements

The Inter-ministerial Conference for the Environment[18] have taken a series of decisions that clarify the role and responsibilities of different entities as regards the preparation of the national GHG inventory. An overview of these decisions, and relevant extracts, are listed below:

(a) Decision of the Inter-ministerial Conference for the Environment (ICE), 7 October 1999

– [..] future inventories of GHG emissions shall be established on the basis of the data delivered by the regions, and completed, if required, by complementary information.

(b) Decision of the Inter-ministerial Conference for the Environment, 6 March 2002

– [..] The ICE confirms that the Regions shall deliver annually their most recent data on greenhouse gas emissions for the purpose of international reporting and for the assessment of the domestic climate change policy. The ICE decides that emission data shall be collected in accordance with procedures as defined in UNFCCC guidelines, concerning the national inventory of greenhouse gas emissions. Regions commit themselves to deliver their data on greenhouse gas emissions for the previous year as from 31-12-2004.

[16] Belgium has elected the net emissions or removals of afforestation, reforestation and deforestation under Article 3.3 and has not elected grassland and cropland management under Article 3.4 for inclusion in its accounting for the first commitment period (2008-2012)

[17] In accordance with IPCC guidelines, emissions from electricity producing waste incinerators are included in the electricity generation sector in this report. However, emissions from household waste incinerators are discussed here in order to give a complete overview of waste-policy related emissions

[18] The Inter-ministerial Conference for the Environment (ICE) is a specialised committee devoted to matters for which intergovernmental co-operation is required for implementing environmental policies

– [..] The Belgian Interregional Environmental Agency (CELINE-IRCEL) is in charge of the annual compilation of data of the national greenhouse gas inventory, under the Common Reporting Format as described in the UNFCCC guidelines, based on data delivered annually by the regions. The ICE decides that the human resources within CELINE-IRCEL must be consolidated so as to ensure compliance with international reporting obligations as regards greenhouse gas inventories.

– [..] The ICE gives mandate to the Working group on Emissions of the Coordination Committee for international environmental policy (CCIEP) and CELINE-IRCEL, in collaboration with the coordination group "greenhouse effect" of CCIEP, [..] to elaborate a procedure of quality control of the national greenhouse gas inventory and to notify this procedure to the ICE.

In 2002 the "Cooperation agreement between the Federal State and the Regions for the implementation and the follow-up of a National Climate Plan, and the reporting in the context of the UNFCCC and KP, 14 November 2002" was signed:

[the National Climate Commission shall:]

– undertake the reporting obligations in the context of decision 280/2004/EC (EU mechanism for monitoring GHG emissions) and the UNFCCC, in collaboration with the relevant departments and the Coordination Committee for international environmental policy (CCIEP);
– make sure that methodologies, procedures, data analysis, projections used by the Parties to the agreement are compatible and, if possible, harmonised.

The regions are committed to deliver yearly to the National Climate Commission a report containing the relevant information allowing the Federal Government to report data in accordance with the UNFCCC guidelines and with decision 280/2004/EC.

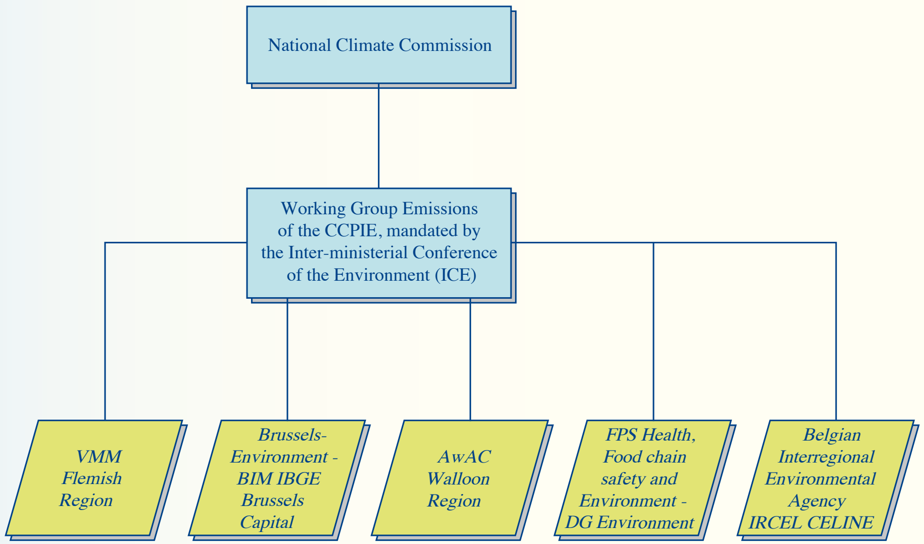


Figure 3.16 Main institutions and organisations involved in the preparation of the national GHG inventory

3.3.2.2 Institutions and procedures

Entities responsible for the performance of the main functions of the Belgian Inventory System, as well as main institutional bodies in relation with the decision process as regards this system, are presented in figure 3.16 and listed hereafter.

As decided by the legal arrangements, the **3 regions** are responsible for delivering their greenhouse gas inventories, which are later compiled to produce the Belgian GHG inventory. The main regional institutions involved are:

– The Department Air, Environment and Communication of the **Flemish Environment Agency (VMM)** in the Flemish Region;
– The **Walloon Agency for Air and Climate (AWAC)** in the Walloon Region;
– The **Brussels Institute for the Management of the Environment (Brussels Environment - IBGE)** in the Brussels Capital Region.

At the federal level, the Directorate General Energy of the Federal Public Service Economy, SMEs, Self-employed and Energy (FPS - DG Energy) is responsible for the top-down estimation of energy-related CO_2 emissions using the IPCC "reference approach", on the basis of the national energy balance. The Directorate General Environment of the Federal Public Service for Health, Food Chain Safety and the Environment (FPS - DG Environment) is also involved in the national inventory system in its capacity of UNFCCC National Focal Point of Belgium.

The Working group on Emissions of the Coordination Committee for International Environmental Policy (CCIEP) (referred to below as "CCIEP-WG Emissions") plays a central role in the coordination of the national GHG inventory. The CCIEP is the principal organ for coordinating international environmental policy. Its Working group on Emissions is a regular body of exchange of information between the regions, IRCEL-CELINE and the UNFCCC National Focal Point. All technical aspects of the GHG inventory (methodological choices, emission factors, uncertainty analysis, QA/QC, etc.), as well as organizational aspects of the preparation process, are coordinated via the CCIEP-WG Emissions. Beside the CRF-submissions, other reporting requirements such as the National Inventory Report and responses to the review processes are prepared within this group. The CCIEP-WG Emissions is also the forum for the process of improvement of the national inventory system.

The Belgian Interregional Environmental Agency (IRCEL-CELINE) is the single national entity with overall responsibility for the preparation of the Belgian GHG inventory. IRCEL-CELINE operates as national compiler of greenhouse gas emissions in Belgium. It is responsible for collecting the regional estimates of GHG emissions / removals and for compiling the three sets of regional data into one national inventory.

The National Climate Commission has the general responsibility for the establishment, execution and monitoring of the National Climate Plan and for fulfilling the reporting obligations under the United Framework Convention on Climate Change and the Kyoto Protocol. In this respect, this Commission is in charge of the approval of the inventory reports.

3.3.3. Process for the development of emission estimates

A general and detailed description of the methodologies can be found in the National Inventory Report submitted each year to the UNFCCC.

By following intensively regional, national and international workshops on estimating GHG emissions and sinks, the organizations responsible for setting up the emission inventory in Belgium keep in touch with all possible developments on that subject and try to optimise the emission inventory as efficient as possible.

3.3.4. Key source identification

Key source categories are identified according to the Tier 1 methodology described in the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories and the IPCC Good Practice Guidance for LULUCF. Both a level assessment (contribution of each source category to the total national estimate) and a trend assessment (contribution of each source category's trend to the total trend) are conducted during the 2013 submission. A level assessment is performed for the years 1990, 2010 and 2011 and trend analysis is carried out for the years 1990-2010 and 1990-2011, both with and without LULUCF sectors.

The key source analysis is realised on the basis of table 5.4.1 as suggested in IPCC GPG for LULUCF. Each greenhouse gas emitted by a single source category is considered separately. The key source analysis is performed by using CO_2-equivalent emissions calculated by means of the global warming potentials (GWPs) specified in the UNFCCC reporting guidelines on annual inventories. This procedure determine of a set of 49 key source categories during the level assessment 2011 covering 95% of the total aggregated emissions and 53 key source categories for the trend assessment 1990-2011 contributing to 95% to the trend of the inventory.

3.3.5. Recalculation

Recalculations of the GHG emissions in Belgium, in accordance with the IPCC Good Practice Guidance and relevant decisions of the COP and/or COP/MOP, are carried out in the regional and national emission inventory. All recalculations of previous submitted estimates of GHG emissions by sources and removals by sinks are described yearly in the National Inventory Report (sections 3 to 10).

Many recalculations have been conducted since the fifth National Communication, particularly in the 2013 submission, following the in-country review of September 2012. As many sectors were concerned, they are not described in details here. Details are given in chapter 9 of the NIR 2013, downloadable on www.unfccc.int.

3.3.6. Quality assurance and quality control plan,

Belgium did submit a full QA/QC plan of the Belgian national system to estimate anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol. This was submitted on 20 October 2008 to the UNFCCC-experts as a demand of the UNFCCC-centralised review carried out from 1-6 September 2008. In the final UNFCCC Annual Review Report (Report of the individual review of greenhouse gas inventories of Belgium submitted in 2007 and 2008) the ERT (expert review team) concluded that the QA/QC plan had been prepared and implemented in accordance with the IPCC good practice guidance.

Belgium is a federal state organised in communities and regions. The three regions (Flemish Region, Walloon Region, Brussels-Capital Region) are responsible for the GHG inventory of their own territory. Consequently every year, 3 inventories are compiled and aggregated into a national greenhouse gas inventory, which is managed by the Belgian Interregional Environmental Agency (IRCEL/CELINE).

The bodies responsible for the preparation of inventories in the three regions are:

- AWAC: Walloon Agency for Air and Climate;
- VMM: the Flemish Environmental Agency;
- Brussels Environment (IBGE/BIM)

The activities of these bodies, as regards the preparation of the national greenhouse gas inventory and implementation and development of the QA/QC plan, are coordinated via the "Working group on Emissions of the Coordination Committee for International Environmental Policy (CCIEP)" (referred to below as "CCIEP-WG Emissions"). This group plays a central role in the coordination of the national

GHG inventory. It is a permanent platform for the exchange of information between the regions, IRCEL-CELINE, the National Climate Commission (see below) and the Belgian UNFCCC National Focal Point. All methodological aspects of the GHG inventory (methodological choices, emission factors, uncertainty analysis, etc.), as well as the implementation and improvement of the national system, including the QA/QC plan, are coordinated via the CCIEP-WG Emissions. This working group meets together on a regular basis and is responsible for coordinating all emission inventory tasks in Belgium.

More information on the various actors can be found in the Belgian National Inventory System which was updated during the 2009 submission to the UNFCCC-secretariat.

3.3.7. Procedures for the official approval of the inventory

After the national inventory is compiled, under the CRF format, the Belgian CRF-submission is first approved by the CCIEP-WG Emissions. Then it is transmitted to the National Climate Commission. All the mandatory reports in the framework of the UNFCCC, the Kyoto protocol and the European Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol are subject to approval by the National Climate Commission. The final drafts of these mandatory reports are communicated, for approval, to the National Climate Commission two weeks before the due date for submissions. These draft reports may be amended at the request of the National Climate Commission. At least 1 week before the due date for the submission, the National Climate Commission gives its approval on the documents, which are then submitted to the UNFCCC Secretariat through the UNFCCC National Focal Point or to the EU Commission via the Permanent Representation of Belgium to the European Union.

The timeline for the approval and submission of inventory data (year 20X as last year available) and other information related to GHG inventories is summarised below:

- 01/01/20X+2: submission of inventory data and supplementary information to the NCC for approval (submission to the European Commission: 15/01)
- 01/03/20X+2: submission of the final versions of the national inventory data, the NIR and supplementary information to the National Climate Commission (submission to the European Commission: 15/03);
- 31/03/20X+2: submission of the final versions of the national inventory data, the NIR and supplementary information to the National Climate Commission (submission to the UNFCCC: 15/04).

3.4. National registry

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

Federal Public Service of Public Health, Food Chain Safety and Environment
DG Environment - Climate Change Section
Mark LOOMAN - authorised representative of the registry administrator
Eurostation Building, Victor Hortaplein 40 - bus 17, 1060 Brussels
tel: +32 (0)2 524 95 32
mobile: +32 (0)473 333 968
e-mail: Mark.Looman@environment.belgium.be
Remark: There are two registry administrators (Pieter Baeten is the second one)

(b) The names of the other Parties with which the Party cooperates by maintaining their national registries in a consolidated system;

In June 2012, the Belgian registry (as well as all other European registries) was migrated towards the Consolidated System of EUropean Registries (CSEUR) developed by Trasys on request of the European Commission (EC).

The EC is in charge of the hosting, development and maintenance of the CSEUR.

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

The software used for the BE registry, since June 2012, is the CSEUR developed by Trasys (currently version 5.4.2).

The complete description of the consolidated registry was provided to the UNFCCC in the common readiness and specific readiness documentation for the national registry of EU and all consolidating national registries.

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

The CSEUR fully conforms to the DES standards. The CSEUR software was accredited by the ITL administrator (on 1 June, 2012) to operate under Kyoto rules. During the certification procedure, the CSEUR was notably subject to connectivity testing, connectivity reliability testing, distinctness testing and interoperability testing to demonstrate capacity and conformance to the DES.

Since the beginning of 2009 annual SEF reports have been provided ensuring proper accounting of Kyoto units.

(e) A description of the procedures employed in the national registry to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of emission reduction units (ERUs), certified emission reductions (CERs), temporary certified emissions reductions (tCERs), long-term certified emission reductions (lCERs), assigned amount units (AAUs) and/or removal units (RMUs), and replacement of tCERS and lCERs, and of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transactions;

The overall change to the CSEUR also triggered changes to discrepancies procedures, as reflected in the updated manual intervention document and the operational plan. The ITL procedure for manual interventions has been included in the manual intervention procedure for the CSEUR.

Each year the SEF report checks that there are no discrepancies between the records of Kyoto units in the Belgian, UN and EU registry systems. Over the past years (since January 2009) the Belgian SEF reports were judged complete by the UNFCCC and showed no discrepancies.

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

The overall change to the CSEUR triggered changes to security, as reflected in the updated security plan. The software has been implemented so as to deter or forbid certain unwanted transactions (ex. certain transactions can be blocked via a security matrix).

User access to the CSEUR is secured with username, password and a one-time SMS-token. Additional security measures for user and administrator access are currently under discussion in the security working group.

Some additional security measures (trusted account lists and transaction delays) were implemented as well.

All administrative procedures are currently being documented, maintained and implemented in an administrative support tool (REgistry Management Application; REMA) especially developed on request of the Belgian registry administrator for use with the CSEUR. This ensures a consistent and thorough checking of all requests.

To request opening of accounts, changes to the account data,… users need to send in completed and signed paper forms via registered mail using provided templates (on which basis a procedure will be started in REMA).

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

Public reports are available at the registry's general public website:

- http://www.climateregistry.be/NL/INF/reports.htm (Dutch version)
- http://www.climateregistry.be/FR/INF/reports.htm (French version)
- http://www.climateregistry.be/EN/INF/reports.htm (English version)

Table 3.3 Scheduled and unscheduled downtime of the Belgian registry in 2012 (in minutes per month)

Month 2012	Scheduled downtime [minutes]	Unscheduled downtime [minutes]
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June*	17400 (migration towards and activation of the CSEUR)	0
July*	0	0
August*	360	934
September*	3240 (upgrade of the CSEUR software to v4.04)	0
October*	1980 (upgrade of the CSEUR software to v4.04)	0
November*	0	0
December*	120	120

* The figures for the second half of 2012 are estimates based on the communications received from the CSEUR ServiceDesk

Detailed reports on accounts, operators, legal entities, transactions and holdings are available on this public reports pages. The pages also contain detailed information on the two Belgian Article 6 projects that have been approved so far (the YARA Tertre Uhde 2 and Uhde 3 abatement project).

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

The general public registry website is: http://www.climateregistry.be;

The secured access to the registry is: https://ets-registry.webgate.ec.europa.eu/euregistry/BE/index.xhtml

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

Backups are made and a detailed disaster recovery procedure is in place to ensure that –in the worst case– the CSEUR can be recovered on a backup site with a minimized loss of data.

Each working day the registry is manually tested on several checkpoints to ensure a.o. that the reconciliations and transactions ran without error and that there is no abnormal change in the number of accounts, users, failed logins etc.

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

The CSEUR was tested according the ITL administrator accreditation test plan and was certified successfully on 1 June 2012 to operate under the European and Kyoto rules. Test results of newly released versions of the CSEUR software still need to be provided.

Apart from this legally required testing, the registry software is tested by the EC as well as by the registry teams. Inconsistencies or bugs are fed into a JIRA bug-tracking system, and consistently classified, labelled and solved.

A tool is in place to check the availability of a few key pages of the CSEUR on regular intervals.

The table 3.3 indicates how many minutes for each month of the reporting period the Belgian registry was unavailable to its users (a) due to scheduled downtime, and (b) due to unforeseen problems.

References:

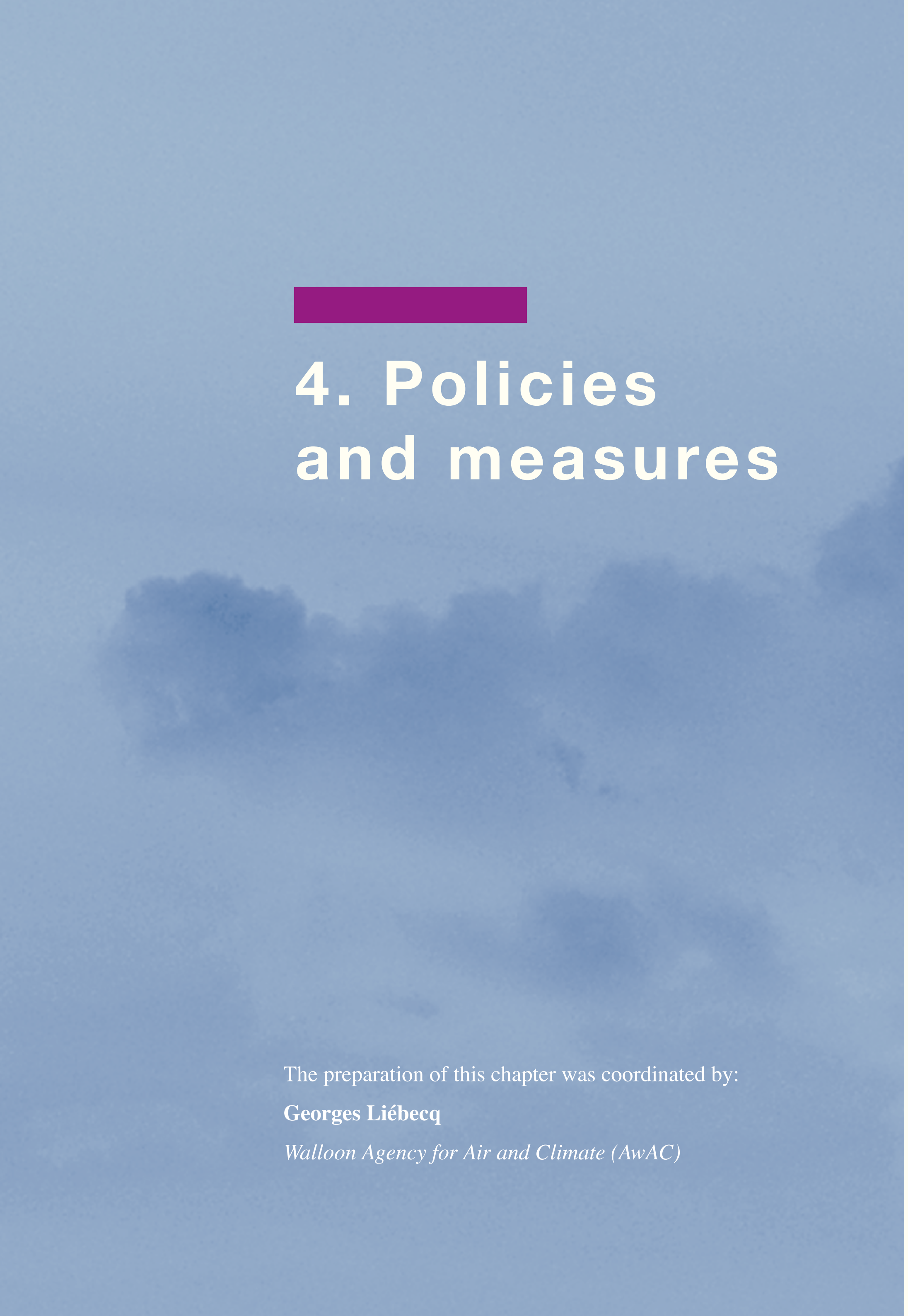
[1] Federal Public Service Economy, S.M.E.s, Self-employed and Energy - (Direction générale de l'Energie - Observatoire de l'énergie) - http://economie.fgov.be/

[2] Banque nationale de Belgique [National Bank of Belgium] (Comptes nationaux / régionaux) - http://www.nbb.be/pub/stats/na/na.htm?l=fr and VITO (Vlaamse Instelling voor Technologisch Onderzoek) [Flemish Institute for Technological Research] - http://www.emis.vito.be/

[3] Federal Planning Bureau - http://www.plan.be/

[4] Federal Public Service Economy, S.M.E.s, Self-employed and Energy - Statistics Belgium - http://statbel.fgov.be/fr/statistiques/chiffres/circulation_et_transport/circulation/parc/

[5] SPF Mobilité et transport [FPS Mobility and Transport]



4. Policies and measures

The preparation of this chapter was coordinated by:

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4.1. Policy-making process

4.1.1. Overall policy context

In the Belgian federal system, responsibilities and policy-making powers are divided among the Federal Government and three regions (the Walloon Region, Flemish Region and Brussels Capital Region).

As far as policies to combat climate change are concerned, the Regions have major responsibilities in areas such as rational use of energy, promoting renewable energy sources, town and country planning, agriculture and waste management.

The Federal Government is responsible for taxation and product policy (product formulation, fuel composition, labelling and performance standards for household or industrial electrical goods). It is responsible for ensuring the security of the country's energy supplies and for nuclear energy. It also supervises territorial waters, which implies that it is also responsible for the development of offshore wind farms.

Given these circumstances, the implementation of climate change policies and measures is based on joint plans drawn up by the federal and regional governments, which set their own priorities and are free to determine their own goals within the scope of their powers. This situation requires the establishment of coordinating bodies as referred to in chapter 2; the ***National Climate Commission*** is the primarily concerned authority in this regard.

In this connection, the ***National Climate Plan*** (2009-2012), which was adopted in April 2009, is based on the plans drafted by the four competent authorities. On 26 April 2012, the National Climate Commission decided to extend this Plan to the period 2013-2020, but the drafting process is still under way and the national burden sharing agreement for the period up to 2020 has not been finalised.[19]

4.1.2. Belgium and the Kyoto Protocol

Belgium signed (1992) and ratified (1996) the United Nations Framework Convention on Climate Change.

1st Kyoto commitment period: 2008-2012

In 2002, Belgium ratified the Kyoto Protocol, entering into a joint commitment with the other European Union Member States to cut greenhouse gas emissions by 8% between 1990 and 2008-2012. Belgium's contribution to this joint commit-

[19] Situation at mid-october 2013

ment took the form of a target of reducing greenhouse gas emissions by 7.5% during that period.[20] This commitment should reduce greenhouse gas emissions from 145 729 Mt CO_2 eq in 1990 to an annual average of 134 799 Mt for the period 2008-2012.

On 8 March 2004, the Consultation Committee between the regional and community governments reached an agreement setting out the responsibilities of each party and allocating the overall burden to the three Regions and the Federal Government. Table 4.1 shows the regional targets set for the first commitment period (2008-2012).

Table 4.1 The national burden sharing agreement for the period 2008-2012

(Mt CO_2-eq.)	Reduction of emissions compared to 1990
Flemish Region	-5.2%
Walloon Region	-7.5%
Brussels Capital Region	+3.475%
Federal Government	-
Total BELGIUM	-7.5%

With this national burden sharing agreement, the sum of the allowances in the three Regions is higher than the average annual ceiling for allowances in Belgium between 2008 and 2012 under the Kyoto Protocol. In order to compensate for the deficit (2.442 Mtonnes CO_2 eq. per year for the period 2008-2012), it was agreed that the Federal Government should obtain additional allowances as a result of the use of flexible mechanisms under the Kyoto Protocol.

Pursuant to this agreement, the Federal Government also issued an undertaking to take internal federal policy measures (within the scope of its powers) to support the reduction efforts of the Regions. The Council of Ministers of 19-20 March 2004 approved a set of federal measures to reduce greenhouse gas emissions. As a whole, this set of measures should guarantee a reduction in greenhouse gas emissions of 4.8 Mt CO_2 eq. per year for the period 2008-2012, which would benefit the Regions.

The National Climate Commission is in charge of monitoring the implementation of these measures at regular intervals and assessing their impact on reducing greenhouse gas emissions to ascertain whether this is in accordance with the ex ante estimation.

The agreement also provides that the Regions can determine the extent to which they may use flexible mechanisms.

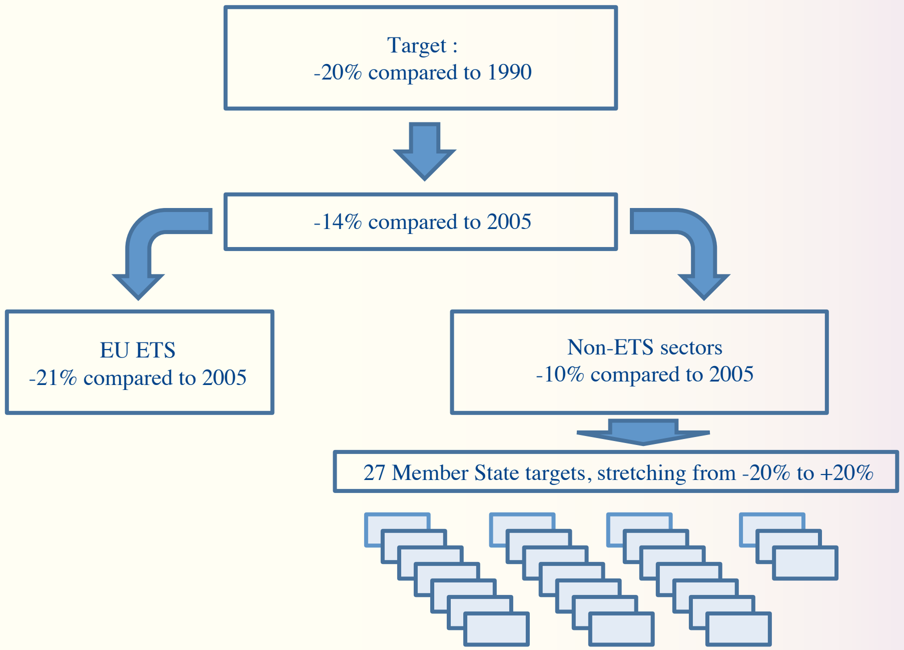
The structures required for the use of flexible mechanisms by Kyoto projects are up and running.

2nd Kyoto commitment period: 2013-2020

Belgium entered into a joint commitment with the other European Union Member States to cut greenhouse gas emissions by a total of 20% from 1990 levels in the period 2013-2020, the second Kyoto commitment period. Further details of how to achieve this target are given in the European climate and energy package for the period up to and including 2020, as described in §4.1.3.

[20] Council Decision 2002/358/EC of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder.

Figure 4.1 Allocation of EU 20% target to EU ETS and non-ETS sectors



4.1.3. The European framework

As a European Union Member State, Belgium has to make its contribution to implementing the current European climate policy, in the form of the climate and energy package, which aims to:

- cut greenhouse gas emissions to 20% below 1990 levels in the European Union as a whole by 2020
- increase the share of renewables in final energy demand to at least 20% in 2020
- improve European energy efficiency, in 2020, by 20% in relation to the level achieved in 2020 under a base trend scenario.

The European targets for reducing greenhouse gas emissions were subdivided into targets for ETS (Emissions Trading System) and non-ETS sectors. ETS is a very important policy instrument for the energy and industrial sectors. It was set up to achieve the reduction in greenhouse gas emissions by companies at the lowest pos-

Figure 4.2 Belgium's projected reduction in greenhouse gas emissions, on a straight-line basis, according to the EU Effort-sharing Decision (Decision No 406/2009/EC)

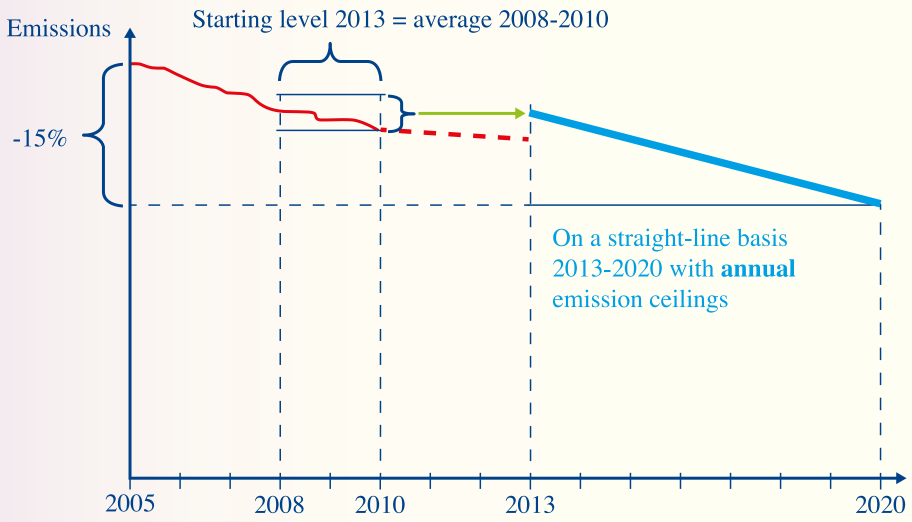


Table 4.2 European policy-making framework (this list is not exhaustive)

Area	Reference	Subject
Transverse	2003/87/EC 2009/29/EC	Emissions Trading System
	2004/101/EC	Flexible mechanisms
	2012/27/EU	Energy efficiency
Production and transformation of energy	2004/8/EC	Promotion of cogeneration (superseded by 2012/27/EU)
	2001/77/EC 2009/28/EC	Promotion of the use of energy from renewable sources
Rational use of energy and reduction of greenhouse gas emissions	2002/91/EC 2010/31/EU	Energy performance of buildings
	2006/32/EC 2012/27/EU	Energy efficiency and energy services Energy efficiency
	406/2009	Effort Sharing Decision
	diverse	Eco-labels; ecodesign of products and equipment
	2003/96/EC	Taxation of energy products and electricity
Sustainable transport		Transport policy white paper Biofuels
	Regulation 443/2009 510/2011	Emission performance standards for new light commercial vehicles
Other		Agriculture and sustainable forestry Waste processing Incineration and co-incineration

sible cost. The climate and energy package revises and supplements the EU ETS via Directive 2009/29/EC (amending Directive 2003/87/EC).

The classification of ETS and non-ETS sectors at European level for the period 2013-2020 is intended to create a level playing field for all European businesses. To make the classification possible, the European target of a 20% reduction on 1990 levels (the international reference year) was converted to a target 14% reduction on 2005 levels. 2005 was the first year in which the ETS regulations were in force, and hence the first year for which Europe had sufficient data to make the classification.

The European target reduction of 14% from 2005 levels was subdivided as follows:

– A target reduction of 21% from 2005 levels for all businesses that are covered by the EU ETS.
– A target reduction of 10% from 2005 levels for all sectors that are not covered by the EU ETS. This relates primarily to the transport, construction and agricultural sectors and, to a lesser extent, some of the energy and industrial sectors that are not covered by the ETS. This target was allocated among the 27 member states in the Effort-sharing Decision or ESD (Decision No 406/2009/EC).

The allocation of the European 20% target for reductions in greenhouse gas emissions is shown in figure 4.1.

Under the climate and energy package, Belgium is required to reduce its greenhouse gas emissions in non-ETS sectors by 15% between 2005 and 2020 on a straight-line basis with annual reduction targets and to increase the share of renewables in final energy demand to 13%. It is also required to improve the energy efficiency of activities on its territory.

These targets have also to be split over the three Regions, defining the contribution from the Federal Government within the scope of its powers.

Belgium's climate policy is, of course, tailored to the EU policy. Belgium's policy therefore includes implementing a set of decisions and regulations and transposing the provisions of certain Directives into national and/or regional law.

Table 4.2 shows some of the main European legislative texts that set the framework for Belgium's climate policy. It is therefore only logical that the policies and measures referred to in this chapter incorporate a large number of actions that stem from one or other of the European legislative texts.

4.1.4. System for monitoring and evaluation of policies and measures

The Belgian authorities (Regions and Federal Government) have undertaken to periodically evaluate the impact of their policies and measures. These evaluations have to use methodologies that differ according to the measures or sets of measures involved and are based on various hypotheses. Above all, the methodology to evaluate polices and measures should be harmonised to make it possible to consolidate the estimates made by the different authorities and to ensure comparability and the ability to identify the most efficient measures.

A task force was set up in late 2008 to develop a single database that would allow harmonised and coordinated monitoring of the policies and measures. The measures are classified by different entries (sector targeted, GHG affected, type of instrument, etc.) and linked to the relevant indicators (implementation status, expected and/or observed CO_2 reduction), with multiple relationships (some measures could be linked to more than one indicator and vice versa).[21]

Federal Government

As already mentioned, one of the Federal Government's responsibilities for burden-sharing pursuant to the Kyoto commitment is to implement a number of measures making it possible to reduce greenhouse gas emissions by some 4.8 Mt CO_2 eq per year between 2008 and 2012.

Several studies have been conducted to this end. The outcome was a table of measures, including a description of the method for assessing the impact of each measure on greenhouse gas emissions and evaluating that impact. Several of the studies had to contend with the stumbling block presented by the technical measures employed by the different policies at federal and regional level. One instance is how to allocate the impact on greenhouse gas emissions of thermal insulation of a home when this measure is simultaneously supported by a regional allowance and a tax allowance on a fraction of the investment granted.

It emerged from these assessments that the overall impact of the Federal Government's measures on greenhouse gas emissions depends to a large extent on the hypotheses used. Verifying that the Federal Government's efforts comply with the initial targets can therefore only be an indicative exercise.

All the results of these studies can be viewed online[22] and have been presented to the National Climate Commission. The assumptions and methodology used were also discussed with the task force on the policies and measures of this Commission in order to contribute to the national estimates of reductions in greenhouse gas emissions.

Flemish Region

The Flemish Climate Policy Plan 2006-2012 has been a strategic policy plan which served as a guide for the period 2006-2012 for achieving the Flemish Kyoto objective,

[21] To consult the database, go to: http://www.cnc-nkc.be/Klimaatplan/Default.aspx

[22] To consult the various reports, go to http://www.climat.be/spip.php?article518

i.e. the reduction of greenhouse gas emissions by an average of 5.2% compared to the emissions in 1990 for the period 2008-2012. In absolute terms this means that the average emissions during the period 2008-2012 may amount to a maximum of 82.463 Mtonnes CO_2 eq per year.

On 1 July 2011, the Flemish government approved the draft proposal concerning preparatory work for the Flemish Climate Policy Plan 2013-2020, comprising a Mitigation Plan and an Adaptation Plan. The Flemish Mitigation Plan 2013-2020 (FMP) was drafted by the Flemish Mitigation Task Force (FMTF), chaired by the environmental policy unit. The FMTF was responsible for coordinating the FMP and developing a monitoring system. The FMTF facilitated harmonisation among the policy units and also provided a suitable forum for exchanging information on good practice based on its own expertise, examples from other countries and dialogue with civil society. The task force was made up of representatives of the environmental, energy, mobility and agriculture policy units. As and when necessary, a more extensive group of representatives was invited to supplementary meetings on specific topics. In their particular sector, the members of the task force acted as coordinator for this broader group of representatives. The FMTF will continue to coordinate the implementation and monitoring of the FMP.

The Flemish government also decided to engage in dialogue on the Flemish Region's climate policy with all the relevant parties in areas of expertise associated with the problems of climate change. This encompasses a very diverse and extensive group of organisations, such as advisory committees, enterprises, professional federations, environmental associations, government bodies, social organisations, research agencies, universities and other scientific establishments, unions and employers' organisations. To this end, as a follow-up to a Flemish Climate Conference (FCC) as part of the Flemish Climate Policy Plan 2006-2012, a further FCC was held with a new form and approach, the main aim being to bring all the major stakeholders together again.

The Minister for the Environment gave the go-ahead for the mitigation plan under the new FCC in a general launch on 25 November 2011. Information on the challenges of climate change in the short and long term and details of the procedure in the run-up to the FMP were provided during the launch. A round-table conference was subsequently arranged for the stakeholders in each non-ETS sector. This provided the opportunity to discuss the current mitigation options and to consider potential additional measures for the short and long term.

The Flemish government ratified the Flemish Mitigation Plan 2013-2020 on 28 Junes 2013.[23] The Flemish Mitigation Plan 2013-2020 is a strategic policy plan with measures for the non-ETS sectors in the Flemish Region from all relevant Flemish policy fields, and is linked to the Flemish government's broader policy. For instance, it provides details of the objectives of the Pact 2020 and establishes links with Flanders in Action (ViA), the Flemish Sustainable Development Strategy, the MINA-plan 4 (Flemish Environmental Policy Plan) and other policy plans of the relevant policy fields (including Flemish Mobility Plan, Flemish Energy Efficiency Action Plan, Flemish Renewable Energy Action Plan, Flemish Housing Policy Plan and Flemish Town and Country Planning Policy Plan).

In order to achieve the European climate targets in due time, priority will be given to the implementation of all internal measures that are technically and economically feasible and socially acceptable. Cost effectiveness is a major criterion in the selection of policy measures, supplemented where necessary with the use of flexible mechanisms. The international standards for sustainable development were applied in this respect. The exact target for non-ETS sectors in the Flemish Region was not yet known, because the allocation among the various regions in Belgium has not yet been made. Under the Flemish Mitigation Plan 2013-2020 as approved, the annual emission allocation for the Flemish Region is based on an (indicative) target reduction of 15% for the non-ETS sectors.

A monitoring system will be set up to facilitate progress reporting; it will be tailored to the European schedule and reporting requirements. In terms of form, content and timing, this monitoring system will be geared as closely as possible to other (sector) reporting in a similar framework (e.g. Mobility Plan and Energy Efficiency Plan). Remedial measures will be required if the monitoring ascertains deviations from the projected (indicative) progress in cuts. The plan is therefore seen as a document in progress and will be updated annually by means of progress reports.

Walloon Region

Initially, a Walloon government body was charged with monitoring the Air-Climate Plan ratified on 15 March 2008. An administrative task force was also set up. It was made up of the Directors General and public interest bodies (PIB) affected by the Plan (these being the ISSeP (public service scientific institute), FOREM (employment and training), SOFICO (supplementary infrastructure funding), SRWT (Walloon Regional Transport Company), SWCS (Walloon Social Credit Company), SWL (social housing authority), FLW (housing fund for large families) and the Walloon Air and Climate Agency. A steering group piloted the Plan and was responsible for providing input and setting the priorities of the administrative task force.

The Walloon Air and Climate Agency was assigned responsibility for monitoring the plan in July 2009. From then until 2012, the Walloon Air and Climate Agency

[23] http://www.lne.be/themas/klimaatverandering/klimaattips/klimaattips/wat-doet-de-vlaamse-overheid/vlaams-klimaatbeleidsplan

made six-monthly progress report based on data provided by persons directly responsible for the measures within the different Walloon public bodies.

Policies and measures concerning CO_2 emissions are included in various plans, for instance: the Air-Climate Plan, the Energy Efficiency Action Plan, the Renewable Energy Action Plan and the "Alliance Emploi-Environnement" (Employment/Environment Alliance). These measures are currently monitored by the respective bodies responsible.

The monitoring mainly involves implementing measures and, insofar as possible, assessing the impact of these measures on energy consumption and greenhouse gas emissions. This is the case regarding voluntary energy/CO_2 agreements in industry, granting financial aid for rational use of energy and the market for green certificates for use of renewable sources of energy. Insofar as they are available, these sources of information are used to quantify the impact of the measures referred to in this chapter.

Brussels Capital Region

A new integrated Air-Climate-Energy Plan is currently in the process of being adopted for the Brussels Capital Region, superseding the first regional Air-Climate Plan 2002-2010. The new Plan is broader in scope that the initial Plan and it is intended to cover all areas that have an impact on climate, i.e. buildings, town planning, environmental planning, companies doing business in Brussels, transport, the example set by public authorities, product consumption and use, financing and energy production. This integrated approach based on a single plan will make it possible to ensure harmonisation of the measures taken in respect of these various areas, assess their combined effects on air quality and the climate, highlight their areas of overlap and synergies (evident and potential) and avoid the effects of some measures having a negative impact on the projected effects of others.

In the Brussels Region, policies and measures concerning CO_2 emissions are included in various plans, for instance: the Air-Climate Plan and the Energy Efficiency Action Plan. These measures are currently monitored by Brussels Environment based, inter alia, on the inventories of greenhouse gas emissions, the Region's annual energy report and projections.

This monitoring mainly involves implementing measures and assessing their impact on energy consumption and greenhouse gas emissions.

4.2. Domestic and regional programmes; legislative arrangements, enforcement and administrative procedure

4.2.1. Description of domestic legislative arrangements to meet the Kyoto Protocol commitments

According to the Kyoto Protocol reporting guidelines (paragraph 37), Belgium must draw up a report describing all the domestic and regional legislative arrangements and all the enforcement and administrative procedures to be put in place, how they are implemented and procedures for addressing cases of non-compliance under the Belgian legal framework.

The National Climate Plan 2009-2012, approved by the National Climate Commission, fulfils this obligation, and its expected extension to 2020 will provide the legal basis for the decisions to be taken to honour the commitments entered into by Belgium under the European Energy & Climate Package.

The legal basis for the obligation to evaluate the federal policies and measures (PAMs) is the Cooperation Agreement of 14 November 2002 between the Federal State, the Flemish Region, the Walloon Region and the Brussels Capital Region, which provides that a National Climate Plan must be drawn up, executed, evaluated and reported to the UNFCCC under the Kyoto protocol. A framework is also being drawn up for the period 2013-2020.

This Agreement also stems from the obligation to apply European Decision 280/2004/EC establishing the mechanism for monitoring and reporting greenhouse gas emissions in the European Community and for implementing the Kyoto Protocol.[24]

4.2.2. Acces to information

Public access to environmental information in Belgium, including legislative instruments, policies and measures developed under the Kyoto Protocol, is regulated at federal level and in the Regions by the legislation transposing European Directive 2003/4/EC on public access to environmental information (based on the first pillar of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters). This has been reflected in various legislative and regulatory initiatives at both federal and regional levels.

[24] Now replaced by Regulation (EU) No 525/2013.

4.2.3. Participation in the Kyoto mechanisms

The division of authority concerning approval of project activities is laid down in a Cooperation Agreement between the Federal Government and the 3 Regions of the country concerning the implementation of certain provisions of the Kyoto Protocol (19 February 2007).

Designation of DNA/DFP

On 8 March 2007, Belgium notified the UNFCCC that its National Climate Commission has been legally designated as national Focal Point (FP) and Designated National Authority (DNA) for JI and CDM project activity approval.

The approval procedures have been published on the website of the National Climate Commission (http://www.cnc-nkc.be/KLIMAATPLAN/EN/Home/Focal-point/ApprovalNCC/).

In this role, the Commission is authorised to approve the project activities submitted to it. However, it must obligatorily respect the administrative and technical decisions by which the regional and federal authorities approve project activities in cases where this comes within their competence.

Distribution of authority for the approval of project activities

According to Article 1, Section 27, of the 'Flex Mech' Cooperation Agreement (and in accordance with the Marrakech Agreements), project approval constitutes written authorisation enabling one or more people to participate in a project activity.

Article 5 of this Agreement specifies the cases in which the federal or regional authorities are authorised to grant approval. According to Article 7, the activities not covered by any of these categories are approved by the National Climate Commission.

A Region may approve the following project activities:

– each project activity that is completely or partially financed by that Region, or by a province or municipality in their territory;
– each project activity from which the Region wishes to obtain Kyoto units;
– each CDM or JI project activity for which a request for approval has been submitted by a natural person residing in the relevant Region or by a legal person with a business address in that Region;
– each project activity that will be executed within that Region's territory.

The Federal Government approves all project activities from which it gains Kyoto units.

If a project activity, according to the above-mentioned criteria, simultaneously falls under the authority of several Regions or of one or more Regions and the Federal Government, then it will be dealt with by the authority where the application was submitted for approval, following consultation with the other competent authorities concerned. If the project activity is to take place within the territory of a Region, the request for approval is always submitted to and dealt with by the Region in question.

Each project activity that does not fall under the authority of a Region or the Federal Government in accordance with Article 5 will fall under the authority of the National Climate Commission.

Approval procedures

The Regions, the Federal Government and the National Climate Commission have adopted their procedure and approval criteria, which are listed on their respective websites.

4.2.4. Information on Articles 3(3) and 3(4) of the Kyoto Protocol

The afforestation/deforestation activities pursuant to Article 3(3) of the Kyoto Protocol, which it is obligatory to record for the commitment period, accounted for net emissions of 225 kt CO_2 in 2011, i.e. 0.2% of Belgium's total emissions.

It should be noted that afforested and deforested areas are more or less in equilibrium on an annual basis (1130 hectares afforested as opposed to 900 hectares deforested in 2011), but that this leads to net emissions as the emissions from deforestation are recorded during the year, whereas the reforestation merely leads to gradual storage of CO_2 by the ecosystems.

Belgium has not selected any activity under Article 3(4).

4.2.5. International transport

International aviation

On 13 January 2009 Directive 2008/101/EC to include aviation in the European Union Emissions Trading Scheme (ETS) was published in the Official Journal of the European Union.

The Directive introduces an emissions trading system for airlines. It requires the surrender of emission allowances for all CO_2 emitted during the calendar year (starting from 2012) by flights covered by the Directive. The emissions must be determined using a monitoring system, which is developed in accordance with the monitoring and reporting guidelines (MRG). Emissions must be reported after each calendar year (before 1 April of the following year) and the number of emission allowances corresponding to the reported emitted quantity of CO_2 must be surrendered before 1 May.

The total amount of emission allowances accounts for 97% of the yearly average historic emissions in the period 2004-2006 for the year 2012, and for 95% for the years 2013-2020. 85% of allowances will be distributed free of charge until 2020. In principle, all flights that depart from or arrive at airports in the territory of a Member State fall under the scope of ETS, but some activities have been exempted from the EU ETS. The Directive provides for one Member State to be responsible for administering each airline participating in the EU ETS. Belgium is administering Member State for 56 airlines.

The ICAO meeting in November 2012 saw significant progress in the negotiations towards the introduction of a regulation on greenhouse gas emissions for international air navigation.

The ICAO acknowledges that a market-based approach is feasible. A framework for the implementation of the market mechanisms might be approved at the 2013 ICAO Assembly. A high-level political process will work on the preparation of the recommendations.

In order to show its willingness in relation to these proposals, the European Commission proposed a 'stop-the-clock' mechanism.

This mechanism is designed to allow non-European flights not to be included in the declarations of greenhouse gas emissions for 2012. This is a voluntary mechanism. If an airline wishes to implement this provision, it will have to surrender voluntarily the allowances linked to these flights received free of charge. These allowances will subsequently be cancelled. The Member States then undertake not to implement the penalty process.

This mechanism is temporary. Further adjustments to the Directive depend on the progress within the ICAO in 2013.

This means that Member States do not need to amend their legislation.

For Belgium, 17 airlines have benefited from the 'stop-the-clock' derogation and were allocated allowances only for the flights not subject to the derogation.

International shipping

In July 2011, the Marine Environment Protection Committee of the International Maritime Organisation decided that, through an amendment to MARPOL Annex VI, the Energy Efficiency Design Index (EEDI) is to be mandatory for all new ships and a Ship Energy Efficiency Management Plan (SEEMP) for all ships from 2013. The EEDI requires a minimum energy efficiency level for various ship types and sizes. The SEEMP is a plan describing how to improve the energy efficiency of a ship cost-effectively.

In the European Climate & Energy Plan adopted in 2009, the European Parliament and the Council called upon the European Commission, in the event that no international agreement – which includes international maritime emissions in its reduction targets through the International Maritime Organisation – has been approved by the Member States of the European Union, or no such agreement through UNFCCC has been approved by the Community by 31 December 2011, to make a proposal to include international maritime emissions in the Community reduction commitment, with the aim of the proposed legislation entering into force by 2013.

This deadline has expired without sufficient international action having been taken to lead to absolute emission reductions in relation to historical base years (as a result of growth in maritime transport, EEDI and SEEMP are insufficient). On account of the strong preference of the EU Member States and the European Commission for a global measure and because a robust monitoring and reporting system is a prerequisite for each 'market-based measure' and efficiency standard for the maritime sector, the Commission issued a proposal for a Regulation on 28 June 2013 introducing monitoring, reporting and verification obligations for maritime transport above 5000 GT to and from EU ports from 2018. The aim of the proposal is to accelerate the launch of an initiative within the IMO. The Commission proposal is being examined at the Council and the European Parliament in 2013-2014.

4.3. Policies and measures and their effects

4.3.1. The National Climate Plan and regional policies up to 2020

The National Climate Plan (2009-2012)

The National Climate Plan is based on all the policies and measures contained in the regional climate plans and those for which the federal authorities are competent. It was drawn up first and foremost to enable Belgium to meet its obligations under the Kyoto Protocol.

The National Climate Plan is not set in stone: formal provision has been made for annual results-based adaptation deriving from monitoring the impact of these policies.

The **first objective of the National Climate Plan** is to formalise the major strategic priority measures that Belgium must implement. The aim is in particular to optimise the impact of policies and measures rolled out by the various competent authorities so as to develop synergies and identify complementary approaches, while taking into consideration the respective competences of these bodies.

Eleven strategic areas (or fields of interest) have been identified for this purpose:

Six sectoral strategic areas have been defined:

1. Optimisation of energy production
2. Rational use of energy in buildings
3. Influence on industrial processes
4. Development of sustainable means of transport
5. Encouragement of the sustainable management of agricultural and forest ecosystems
6. Boosting of waste management efforts

The plan contains five additional broader-based strategic areas:

7. Stepping up of research on climate change
8. Raising the awareness of all Belgian stakeholders about tackling climate change
9. Increase the direct involvement of the public authorities in reducing greenhouse gas emissions
10. Implementation of flexible mechanisms
11. Incorporation of climate issues into the development aid policy

A set of concrete policies and measures has been produced for each strategic area. The National Climate Plan establishes priority strategic area undertakings for the reduction of greenhouse gas emissions (CO_2 equivalent) in relation to a baseline.

The **second objective of the National Climate Plan** is to set up a coordinated monitoring system in order to monitor, evaluate and adapt policies and measures. The National Climate Commission is in charge of regular assessment of the implementation of the National Climate Plan. It has two types of instruments at its disposal:

- firstly, greenhouse gas emission projection models enabling a 'rough' estimation to be made of the impact of policies and measures;
- and, secondly, a database containing policy and measure impact indicators with regular updating by the Permanent Secretariat of the National Climate Commission.

The **third objective of the National Climate Plan** is to initiate the drawing up of a national climate change adaptation strategy. All sectors need to be prepared for the inevitable consequences of a rise in temperatures. This version of the National Climate Plan raises only a few issues. Since then the National Adaptation Strategy has been adopted (see chapter 6 of this document for more details).

Finally, the **fourth objective of the National Climate Plan** is to prepare a long-term strategy to tackle climate change. The deadlines for which Belgium has to prepare are, on the one hand, a 2nd phase of the Kyoto Protocol and, on the other hand, the negotiations taking place at the United Nations with a view to drawing up an ambitious international agreement by 2015. It is also a matter of defining a path for transition, encouraged by the European authorities, towards a low-carbon society in Europe by 2050, a necessary condition, but one which is not sufficient in itself, to avoid excessive global warming.

Policies up to 2020

At present, the various entities are preparing their own climate policy and have embarked on discussions which should lead to a sharing of the commitments entered into by Belgium by 2020.

The Flemish Government adopted the final version of its *'Flemish Mitigation Plan 2013-2020'* on 28 June 2013. This plan covers the economic sectors which do not participate in the emission trading scheme.

Wallonia is drawing up the legal framework which should enable the Regional Government to formulate a climate plan to 2020. This 'Climate' Decree should define a path for transition towards a low-carbon society by 2050, establishing 'carbon budgets' spread over 5-year periods. The Climate Plan, under preparation, would be the instrument for the implementation of the path for the first stage up to 2020.

For its part, the Brussels Capital Region has already adopted a legal framework of this kind, in this way opening the way to the preparation of a set of policies and measures: on 2 May 2013, it adopted its Brussels Air-Climate-Energy Code (known as COBRACE)[1] which, as its name indicates, integrates all the policies of the Region with an impact on the climate, air quality and energy management. It includes a certain number of measures in these fields and serves as a legal basis for its Integrated Air-Climate-Energy Plan which is in the process of adoption. This plan will set the guidelines and measures to be taken in order to achieve as a minimum the targets laid down by COBRACE, in accordance with the European Union policy and international law on air, climate and energy. The minimum information contained in the plan is set out in Annex 1.1 to COBRACE. As an urban region, the Brussels Region has also signed the Convention of Mayors, setting itself the objective of a 40% reduction in its emissions between 1990 and 2025.

Finally, the federal authority will develop its own climate strategy as soon as it knows its share in the responsibility for the Belgian commitments up to 2020.

For the initiatives beyond 2020, reference can be made to section 9.4.6 'Towards a low-carbon society'.

[1] Order of 2 May 2013 on the Brussels Air, Climate and Energy Management Code, Moniteur Belge, 21 May 2013, p. 28357

Table 4.3 National Climate Plan: fields of interest (strategic areas) and clusters of measures

Areas		Clusters of measures	
EP	Energy production and conversion	EP-A	Promotion of environmentally-friendly energy production
		EP-B	Maximisation of energy efficiency of electricity generation
EC	Energy conservation in buildings	EC-A	Horizontal measures
		EC-B	Measures in the residential sector
		EC-C	Measures in the tertiary sector
IP	Industrial processes	IP-A	Energy efficiency in industry
		IP-B	Action concerning fluorinated gases
		IP-C	Action concerning industrial emissions of N_20
TR	Transport	TR-A	Promotion of intermodal means of transport
		TR-B	Boosting of transport efficiency
		TR-C	Promotion of more ecological vehicles
		TR-D	Promotion of biofuels
AG	Agriculture	AG-A	Rational use of energy in agriculture
		AG-B	Limit on emissions of CH_4 and N_2O
		AG-C	Maintaining the carbon storage potential in forests
		AG-D	Production of biomass for energy purposes
		AG-E	Horizontal measures
WA	Waste	WA-A	Limits on waste production at source
		WA-B	Waste-to-energy projects
		WA-C	Recovery of waste gases
		WA-D	Composition of biomass flows
		WA-E	Reduction in fluorinated gas emissions
SE	Raising awareness of climate change	SE-A	Horizontal measures
		SE-B	Raising awareness of the rational use of energy in buildings
		SE-C	Raising awareness of industrial environments
		SE-D	Raising awareness of sustainable mobility
		SE-E	Awareness-raising measures based on sustainable agriculture and forestry
OB	Public service obligations	OB-A	Horizontal measures
		OB-B	Promotion of the rational use of energy in buildings
		OB-C	Sustainable mobility

4.3.2. Review of the main PAMs

The National Climate Plan contains around 100 measures but only the main ones are reviewed here. Research, training/education and development aid measures are covered in the other chapters of this 6th National Communication.

The measures are firstly grouped by area. Then they are classified in groups or clusters according to their complementarities, either they have the same target or their impact is on the same sources of emissions. Table 4.3 presents these various clusters broken down according to the fields of action, with the latter corresponding to the main areas referred to above.

Annex 3 of this National Communication provides a detailed overview of each measure and, where possible, provides estimates of the impact of these measures on greenhouse gas emissions.

A reference code is assigned to each measure. This code consists of 2 letters to identify the field of application, a third letter identifying the cluster to which the measure belongs, followed by two digits. For example, measure TR-A01 deals with mobility plans for company employees. It applies to the field of 'transport' (TR) and appears in cluster A 'Promotion of intermodal means of transport'. These references are shown in the text for the convenience of readers.

The structure of the main areas contained in the NCP has been slightly altered here in order to highlight the most salient facts. Accordingly, measures linked to the public authorities leading by example have been allocated to the different corresponding areas.

For each set of measures a distinction is made between the main measures (normal text) and additional measures (in italics).

For more information, please refer directly to the National Climate Plan.[25] The Report by Belgium for the assessment of projected progress dated 29 March 2013 for the European Commission,[26] and the report to the National Climate Commission on the State of progress of the National Climate Plan (September 2011) can also be used for reference purposes.

EP: Optimise energy production

The energy production section explains the Belgian policy to cut greenhouse gas emissions from electricity and heat generation (power stations, coking plants and oil refineries).[27]

The strategy developed in the National Climate Plan focuses essentially on the promotion of renewable energy sources and on high efficiency cogeneration for electricity production. The energy policy tools implemented are essentially market mechanisms:

- green certificates for renewable energy and cogeneration in Wallonia and in the Brussels Capital Region,
- separate certificates for renewable energy and for cogeneration in Flanders.

Equipment of a commercial area and the granting of concessions at sea for the installation of offshore wind farms are also important aspects of the Belgian policy on the promotion of renewable energy sources.

The Emission Trading Scheme (ETS) plays a significant role in the electricity sector, but the allocations of emission allowances to the electricity generators have so far been guided more by the prospects of development of alternative energies than by the search for improvements in the energy efficiency of conventional electricity generating plants. From 2013, the companies in this sector will have to obtain their emission allowances from auctions.

Table 4.4 Electricity production (EP), Clusters EP-A and EP-B

Electricity production: clusters and measures				
	Bodies responsible			
Electricity production	Federal	Flemish	Walloon	Brussels
EP-A: Promotion of ecological electricity production				
EP-A01: Green certificates and CHP certificates system	X	X	X	X
EP-A02: Funding for environmentally-friendly electricity production	X	X	X	X
EP-A03: End of exemption from excise duty & introduction of excise duty on energy for coal products and heavy fuel oil	X			
EP-A04: Establishment of a network of renewable energy sources and CHP facilitators		X	X	X
EP-A05: Action plan for renewable energies and cogeneration	X	X	X	X
EP-B: Maximisation of energy efficiency of electricity generation				
EP-B01: Specific measures for granting allowances to electricity producers	X (*)	X	X	X
EP-B02: Preparation of energy plans by electricity producers		X		

(*) administrative only.

[25] FR: http://www.climat.be/IMG/pdf/PNC_2009-2012-2.pdf; NL: http://www.climat.be/IMG/pdf/NKP_2009-2012-2.pdf

[26] http://cdr.eionet.europa.eu/be/eu/ghgpro/envuvhu0a

[27] The strategy for the use of biofuels for transport is also part of the sustainable energy supply, but it is described under the strategic areas 'Sustainable transport' and 'Sustainable agriculture and forestry'.

All the measures planned to ensure the promotion of the use of renewable energy and high-efficiency cogeneration have been put in place and the policy is starting to bear fruit. This refers in particular to public funding, the establishment of green certificate systems (and CHP certificates for cogeneration in Flanders) and the introduction of facilitator networks.

As regards electricity generation of off-shore wind farms, the measures to be taken by the federal authorities are now in place. There is still a risk of failure to achieve the objective in time as the level of electricity generation by these wind farms depends essentially on the actual commissioning of the off-shore wind farm (2 000 MW by 2012, with 2 200 MW forecasted in 2020). Any delay in granting concessions and during the necessary work limits the expected reduction in emissions.

EP-A01 Green certificates and CHP certificates system

The green certificates (and CHP certificates) mechanism has been developed to support the production of green electricity (i.e. produced using renewable energy sources, such as wind energy, hydraulic energy, solar energy and biomass) and combined heat and electricity production (CHP). The basic principle is that green electricity producers and producers of co-generated electricity are issued with certificates with electricity suppliers being required to purchase a minimum quota of certificates, calculated on the basis of their total electricity sales. Suppliers must pay a fine if they do not meet this production requirement. The quotas to be handed in increase from year to year in order to support the network expansion.

This 'certificates market' creates the conditions needed for making the cost of producing green electricity (or of CHP) competitive compared with other non-renewable sources. It operates within each Belgian entity (federal and regional) although the federal mechanism is based on minimum guaranteed prices rather than mandatory quotas for suppliers. The green certificates mechanism is supplemented in certain entities by mechanisms aiming to guarantee a minimum income for green electricity producers either via funding for production or a minimum guaranteed price for green certificates. In Wallonia and Brussels, the green certificates system is also applicable to high-efficiency cogeneration of electricity, pro rata to the CO_2 emissions avoided compared to separate production of electricity and heat. In Flanders, green certificates are reserved exclusively for electricity from renewable sources, with separate certificates being allocated for high-efficiency cogeneration.

It should be noted that the systems for the allocation of green certificates had to be corrected to avoid imbalances in the market due to the public interest in installing photovoltaic panels, since the financial support (green certificates and subsidies) proved to be too advantageous.

Facilitators, whose remit is to inform and advise investors and help to raise the awareness of target groups such as industry, project developers, the local authorities and educational institutions help support this measure (see EP-A04).

EP-A02 Funding and logistics support for environmentally-friendly electricity generation

Apart from the green certificates scheme, the Belgian authorities have implemented a number of measures aiming to develop the production of energy from renewable sources. Green electricity producers therefore benefit from priority network access in each entity.

The Federal Government has also taken a number of additional measures aiming to cut the relative cost of electricity generation from renewable energy sources. These measures involve special excise duties or levies on the consumption of heavy fuels, coal, etc. (also see EP-A03 regarding the withdrawal of excise duty exemptions on coal products and heavy fuel).

Flemish Region aid encourages industry to invest in renewable energies, co-generation units and energy efficiency. This support measure is described in the "industry" section (IP-A06) and can be tailored and added to other support mechanisms, namely green certificates and the federal deduction for increased investment.

In Wallonia, the UREBA Decree, which came into force on 10 June 2003, seeks to award subsidies to public law corporations and non-commercial bodies to carry out studies and work aiming to improve the energy efficiency of their buildings.

In the Brussels Capital Region, the tertiary sector and industry are offered incentives for using renewable energy and cogeneration. They can be added to economic development aids and to the increased deduction for investment.

For the industrial sector, the aid for economic development includes support for recourse to renewable sources of energy.

Complementary measures are also in place and draw on action plans for using biomass (via an undertaking and code of conduct), the promotion of off-shore wind energy (by funding of the undersea network connection cable, support measures in the event of an output gap, guaranteed initial investment, a simplified procedure for awarding off-shore concessions, etc.) and on-shore wind energy (through town and country planning and network connection options) and the promotion of cogeneration (by adapting base yields for which producers receive supplementary cogeneration certificates, by bringing emissions standards into line with those on fossil fuels, by supporting slurry, agricultural products and organic waste co-fermentation projects in biogas facilities, etc.) (EP-A05).

Table 4.5 Energy conservation in buildings (EC); Clusters EC-A, EC-B and EC-C

Clusters and measures				
Energy conservation	Bodies responsible			
	Federal	Flemish	Walloon	Brussels
EC-A: Horizontal measures				
EC-A01: Rational use of energy as part of public service obligation		X	X	X
EC-A02: Mobilising the resources of the natural gas fund		X	X	X
EC-A03: Energy performance and certification of buildings		X	X	X
EC-A04: Appointment of energy experts		X	X	X
EC-A05: Improvement of the energy efficiency of household appliances	X	X	X	X
EC-B: Specific measures for residential buildings				
EC-B01: Financial incentives encouraging rational use of energy and use of renewable energy sources	X	X	X	X
EC-B02: Specific constraints relating to boilers	X	X	X	X
EC-B03: Specific support for rational use of energy for people on low incomes	X	X	X	X
EC-B04: Improvement of consumer information on the environmental impact of products	X			
EC-B05: Imposition of requirements concerning energy performance and indoor climate environment with respect to houses and flats		X		X
EC-B06: Optimisation of town planning provisions in the context of energy-efficient construction and conversion		X	X	
EC-C: Specific measures for tertiary sector buildings				
EC-C01: FEDESCO Recourse to a third-party investor fund in the public sector	X			
EC-C02: Imposition of requirements concerning energy performance and indoor climate environment with respect to tertiary sector buildings		X	X	X
EC-C03: Measures in the medical, social and education sectors		X		X
EC-C04: Imposition of requirements concerning energy performance and indoor climate environment with respect to industrial buildings		X	X	X
EC-C05: Subsides for a sustainable energy policy in sheltered and social workshops		X		

EC: Energy conservation in buildings

Here are two flagship actions:

- the transposition of the European Directives on the energy performance of buildings (2002/91/EC & 2010/31/EU), especially via increasingly strict requirements regarding the performance of new buildings,
- the existence of financial incentives for renovation (regional premiums and federal tax deductions).

Under the Directives, the energy performance of buildings is no longer measured simply by an overall heat exchange coefficient but is based on a technical estimate taking into account not only the building envelope but also the efficiency of its installations. This leads to increasingly stringent regulations, introduced in stages between now and 2020, with a view to new buildings and major renovations of buildings in time achieving "very low energy" performances and even passive solar behaviour or a 'zero carbon' level.

A second facet of the Directives on the energy performance of buildings provides for the issue of 'energy performance certificates' on any transaction concerning a house or flat (sale, renting out). This certificate is drawn up by qualified, accredited energy experts.

Premiums for energy-saving investments (and for recourse to renewable energy), for both private individuals and legal entities, are granted by the regional public authorities. In Wallonia and Brussels Capital Region, these premiums are financed at least in part from an energy fund and managed directly by the public authorities. In Flanders, these premiums are distributed by electricity suppliers on which quotas proportional to their supply are imposed each year as a public service obligation.

In the context of its obligations resulting from the Cooperation Agreement on sharing the burden of Kyoto, the Federal Government granted tax deductions for energy-saving investments or relating to the use of renewable sources of energy. This tax mechanism was abandoned at the end of 2011, apart from for roof insulation, for reasons relating to the budget and the transfer of powers under the new State reform.

Two initiatives also aim to improve the energy performance of existing buildings, each covering a particular target population, i.e.:

- The creation in 2006 of a *'Fonds de Réduction du Coût global de l'Energie'* (Fund to reduce the overall cost of energy) (FRCE), which is designed specifically for the most underprivileged persons.[28] Under the new institutional reform which is currently under way, this Fund should be subject to a transfer of powers to the Regions.
- The establishment of FEDESCO, a public limited company established on the initiative of the Federal Government, with the object of improving the energy efficiency of the buildings of the federal authorities through a third-party investor mechanism.

The objectives of these initiatives extend beyond the Kyoto period, but are already starting to deliver their first results.

EC-A03 / EC-B05 / EC-C02 / EC-C04: Energy performance of buildings and building certification

The regions are creating their own energy performance certification system. The energy performance certificate informs owners, potential tenants and buyers and users of a building's energy performance and energy efficiency improvement measures which could be depreciated in the short term.

Energy performance and indoor climate environment requirements are applied in each region to construction work with planning authorisations. Further requirements come into play regarding heat insulation, a mandatory level of energy performance and indoor climate environment requirements (EC-B05) for new builds, major extensions or conversion work. Specific energy performance of buildings provisions are also applied to the tertiary sector (EC-C02) and should be to industrial buildings (EC-C04).

The regions have also set up specific energy performance programmes and regulations, which are listed under measure EC-C03, in the medical, social and education sectors.

Energy experts have been given official approval to carry out home energy audits in all three regions, so that quality advice can be provided (EC-A04).

Federal and regional initiatives are endeavouring to achieve rational energy consumption and the promotion of sustainable energy in public buildings (OB-B01). Various measures have been taken, including an energy accounting scheme, an energy audits campaign, provision of solar panel infrastructure and purchase of electricity from renewable energy sources, etc.

Measure OB-B03 lists the initiatives taken by the various public authorities in this area.

EC-B01 Financial incentives encouraging rational use of energy (RUE) and use of renewable energy sources (RES)

Financial incentives are the most effective way of encouraging users to use energy rationally and to use renewable energy sources. Incentives usually come in the form of tax measures or premiums. The amounts are updated on a yearly basis and cover roof, wall and floor insulation, the replacement of single glazing by double glazing, heat insulation of a single-family new build, the construction of a single-family passive house, the installation of a ventilation system with heat recovery, low temperature gas boilers, condensing boilers and hot air generating boilers, natural gas instant water heaters and condensing hot water genera-

[28] FR: http://www.frce.be/index.html; NL: http://www.frge.be/index.html

tors, unit heaters and hot air generators and radiant appliances – heating, heat pumps and biomass boilers (wood and cereals, for example). Equally, heat regulators (thermostat valves, thermostats, etc.), energy audits, thermal imaging audits, co-generation units, electricity consumption analyses (for householders' associations), the installation of an electrical equipment management system (for householders' associations) and the improvement of lighting energy and photometric efficiency (for householders' associations) are also included.

The list of investments in receipt of support is updated regularly according to the latest situation and priorities adopted by the public authorities. In particular, the premiums are adapted in line with the adoption of new regulatory constraints in order to support only efforts made beyond the imposed standard. The boosting of support for insulation especially in the renovation sector and towards passive or low-energy buildings should contribute to improving the reduction of CO_2 emissions.

The applicable tax reduction and maximum deductible amounts were progressively increased until 2012. The programme law passed at the end of 2006 increased two-fold the tax break for energy-efficient investments in housing from EUR 1 000 to EUR 2 000. This tax break could be added to the premiums offered by the regions and/or network operators as part of their public service rational use of energy obligations (also see EC-A01). Since 2008, the Flemish Region provided people who did not, or only partially, benefit from the federal personal income tax relief with an allowance for energy-saving investments. This tax mechanism has now been abandoned to a large extent for reasons of budget and transfer of powers: only roof insulation is still deductible.

Regional measures also include the energy renovation credit or zero interest rate loans. Since 2008 the Flemish Region has implemented a reduction in property tax for new energy-efficient builds. In Wallonia, these mechanisms have led to a true energy policy known as the 'Employment-Environment Alliance' under which the public authorities offer building owners veritable housing renovation contracts. Provided that the owners commit to a programme of works concerning at least one 'improvement to the envelope of the building' aspect and one 'improvement of the heating or hot water systems' aspect, they receive in exchange entitlement to a set of premiums and can cover the balance of the investments by a zero interest rate loan. This system also includes aid for housing rehabilitation and that reserved for the underprivileged. It has met with considerable success since its implementation.

EC-CO1 / OB-B02 Recourse to a third-party investor fund in the public sector

The Federal Government created FEDESCO, a Belgian energy service company, on 4 March 2005 in order to promote energy efficiency in public buildings and remove obstacles to investment so that energy can be saved. FEDESCO is a public/private funded company and invests in projects with good energy consumption reduction potential but which are too costly for the building's owner or administrator.

Energy bill savings in the first instance are used to reimburse the investment made by ESCO and then subsequently benefit the client. FEDESCO has been operational since September 2005 and at the end of 2007 was also tasked with regard to the installation of solar photovoltaic panels on the roofs of federal authority buildings.

IP Influence industrial processes

In industry, the combination of allocations of CO_2 allowances under the ETS and the commitments entered into by companies via:

- the energy/CO_2 sector agreements in Wallonia,
- the energy policy agreement in Flanders,

has enabled significant emission reductions to be achieved, beyond the 'business as usual' performance.

Significant results have also been recorded regarding the reduction of emissions from industrial processes and especially N_2O emissions.

The major priorities of the energy conservation and combating climate change policy in the industrial sector are the implementation of the Emission Trading System (ETS), on the one hand, and a set of sectoral agreements concluded between the Flemish and Walloon public authorities and their main industrial players, on the other. The two were linked for a long time while the States/Regions were responsible for preparing an allowance allocation plan, in so far as the technical content of the agreements provided the ETS with the methodology to evaluate emissions from industrial sites which were to receive allocations of emission allowances.

As far as the ETS is concerned, all the procedures for allocation, verification and reporting are in place and operational. The auctioning of emission allowances has been established.

In Wallonia, the sector agreements took the form of agreements on the improvement of energy efficiency and the associated emissions on the sites concerned. In Flanders, there are two types of agreement: 'benchmark agreements' for the major energy consumers and 'audit agreements' for medium-sized consumers. These agreements have been very successful and a very large number of companies are involved. They cover more than 80% of final energy consumption by industry in each of the two Regions.

In addition, the Regions have established aid for investment in energy-saving or recourse to renewable sources of energy in industry. These mechanisms have been developed in particular under regional policies to support economic development.

The Federal Government, here too, grants tax deductions for investments of this type. These tax incentives have met with limited success, possibly on account of lack of information or attractiveness (cf. IP-A06).

IP-A01 Allowance allocation plan 2008-2012

The Regions were responsible for the allocation plans for CO_2 allowances for facilities in their territory as part of the implementation of Directive 2003/87/EC and took part in the emission trading scheme. The Belgian national allowance allocation plan consisted of the three regional plans. The federal authority coordinated the Belgian plan and acted as the European Commission contact body.

The role of the States and Regions in establishing the ETS for 2013-2020 has become essentially operational. The European Commission now takes charge of drawing up a European allocation plan, sharing out the burden per sector, on the basis in particular of the performances of reference facilities serving as 'benchmarks' for the allocation of allowances in situations where companies benefit from free allowances (risk of carbon leakage). The Member States (and in Belgium the Regions concerned), take charge of recording the allocations at company level, keeping the registers and on-site verification procedures.

Table 4.6 Industrial processes (IP); Clusters IP-A, IP-B and IP-C

Cluster and measures				
Industrial processes	Bodies responsible			
	Federal	Flemish	Walloon	Brussels
IP-A: Action on CO_2 production: Maximisation of the energy efficiency of industry				
IP-A01: Allowance allocation plan 2008-2012		X	X	X
IP-A02: Sector agreements and voluntary agreements		X	X	
IP-A03: Drawing up of energy plans by industry		X		
IP-A04: Reference centre			X	X
IP-A05: Promotion of sustainable activity zones		X	X	X
IP-A06: Specific financial measures and ecology premium	X	X	X	X
IP-B: Action concerning fluorinated gases				
IP-B01: Reduction of fluorinated gas emissions: HFCs, PFCs	X	X	X	X
IP-B02: Reduction of fluorinated gas emissions: SF_6		X	X	X
IP-C: Action concerning the production of N_2O				
IP-C01: Specific agreement with nitric acid producers		X	X	
IP-C02: Reduction of N_2O emissions from the caprolactam industry		X		

IP A02 Sector agreements and voluntary agreements

The Regions have concluded sector agreements with the main industrial federations in synergy with the allocation plan. Sector agreements in Belgium primarily focus on increasing energy efficiency.

In Flanders, energy-intensive companies with annual energy consumption of at least 0.1 PJ are encouraged to reduce their energy consumption by signing up to an energy policy agreement. Following the former audit and benchmark agreement, the Flemish authorities, in consultation with the sectors, has devised an energy policy agreement for the ETS companies on the one hand and the non-ETS companies on the other for the period 2013-2020. Companies signing up to the energy policy agreement undertake to draw up an energy plan and to carry out all viable measures from it. In addition, companies which have signed up commit to carrying out prospective studies on high-quality combined heat and power (CHP) and for district heating and air-conditioning and to implement energy management measures. The Flemish authorities pledge in return not to enforce additional Flemish policy measures with a view to further energy efficiency or CO_2 reductions with regard to industrial activities covered by the agreement.

Sector agreements in Wallonia cover over 80% of Walloon industrial energy consumption. Under these agreements, each industrial sector pledges to achieve improved energy efficiency and greenhouse gas emissions efficiency (solely CO_2 in this case) over a given period. These objectives are defined objectively by audits or by recourse to a benchmark, considering all the investments that are feasible and meet stringent viability criteria in order to ensure that the participating companies commit to an action plan which extends well beyond business as usual. In return, the regional public authorities, working within their remit, pledge not to enforce additional requirements concerning energy and greenhouse gas emissions covered by the agreement with the contracting companies. They also undertake to defend in front of the national and European authorities the principle of exemption from all energy/CO_2 taxes or at least their effects. Company participation is voluntary.

These agreements are in the process of being renewed for the period 2013-2020, by integrating into them a specific section concerning the opportunities to tap renewable energy sources on industrial sites and requiring the companies to draw up 'CO_2 mapping' of their main products either by means of a carbon inventory of their site or by carrying out an analysis of the life-cycle of their products.

In the Brussels Capital Region, companies have the option of taking part in the 'Eco-dynamic enterprise' label scheme. This environmental management label scheme offers official recognition in the Brussels Capital Region for companies with good environmental management practice. The scheme rewards their environmental dynamism and progress made especially in waste disposal, rational use of energy and transport management.

IP-A06 Specific financial measures and ecology premium

Companies can benefit from tax breaks when they make energy-saving investments. Indeed, some energy-saving investments entitle the company to a deduction worth 13.5% of the value of the investment. The fixed assets must be linked to a more rational use of energy, improving industrial processes from an energy perspective, industrial energy recovery, etc. and fit one of the categories listed. The deduction is applied to their earnings or profits.

The Regions promote energy efficiency investment in industry through the investment aid premium. In this case, ecological investments cover environmental investments, energy investments, renewable energy investments and co-generation investments. These measures can be supplemented by other support mechanisms, such as the green certificates and co-generation certificates and the federal deduction for increased investment.

IP-B01, IP-B02 (and WA-E) Reduction of fluorinated gas emissions

Belgium is tackling emissions of fluorinated greenhouse gases in accordance with Regulation (EC) No 842/2006 on fluorinated greenhouse gases and in accordance with directives 2006/40/EC and 2000/53/EC.

Regulation (EC) No 842/2006 stipulates that EU Member States must establish training programmes and staff and company certification for those who install, maintain and provide an after-sales service for refrigeration facilities. It also introduces a regular control system for cooling equipment containing fluorinated greenhouse gases.

Directive 2006/40/EC requires air-conditioning systems in motor vehicles to have a certain level of tightness and bans the use of HFC with a global warming potential of over 150 in new vehicles.

Directive 2000/53/EC deals with recovering HFC from end-of-life vehicles.

The three Regions have adopted regulations concerning the use of stationary refrigeration, air-conditioning and heat pump equipment containing refrigerant gases. These regulations specify in particular some of the aspects covered by Regulation (EC) No 842/2006.

Pursuant to Regulations (EC) No 842/2006 and (EC) No 303/2008 (which clarifies Regulation (EC) No 842/2006 with regard to certification of companies and refrigeration technicians), the three Regions also adopted regulatory provisions for the approval of technicians responsible for the installation and maintenance of stationary applications containing fluorinated refrigerant gases. Certification centres recognised by the three Regions organise training and certification examinations designed for technicians.

The Flemish Region also adopted similar regulations regarding fire protection systems containing fluorinated gases (application of Regulations (EC) No 842/2006 and (EC) No 304/2008) and high-voltage switchgear containing SF_6 (application of Regulations (EC) No 842/2006 and (EC) No 305/2008) and for persons involved in the recovery of refrigerants from air-conditioning systems of cars and vans (application of Regulations (EC) No 842/2006 and (EC) No 307/2008). Since in accordance with the European Regulations cited above, the certificates obtained by companies and technicians are European certificates, they are consequently valid throughout Belgian territory.

The Flemish Region is also planning possibilities for ecology premiums for conversion of existing cooling applications with fluorinated gases to environmental-

Table 4.7 Transport; Clusters TR-A, TR-B, TR-C and TR-D

Clusters and measures				
Transport	Bodies responsible			
	Federal	Flemish	Walloon	Brussels
TR-A: Promotion of intermodal transport				
TR-A01: Mobility or travel plan at local level (municipalities, companies)	X	X	X	X
TR-A02: Improvement and promotion of public transport	X	X	X	X
TR-A03: Promotion of the use of bicycles	X	X	X	X
TR-A04: Promotion of multimodal systems	X	X	X	X
TR-A05: Improvement of transport efficiency (management of congestion and traffic management)		X	X	X
TR-A06: Urban planning restrictions on parking		X	X	X
TR-A07: Taxation of road transport				X
TR-A08: Free public transport for employees	X		X	
TR-B: Boost transport efficiency				
TR-B01: Promotion of car-pooling	X	X	X	X
TR-B02: Promotion of car-sharing		X	X	X
TR-B03: Promotion of tele-working	X	X	X	
TR-B04: Boosting of the efficiency of goods transport		X	X	X
TR-B05: Eco-driving	X	X	X	X
TR-C: Promotion of more eco-friendly vehicles				
TR-C01: Tax measures for the purchase of new vehicles	X		X	
TR-C02: Promotion of the purchase of energy-efficient vehicles	X	X	X	X
TR-C03: Evaluation of the vehicle environmental impact and reform of road tax and vehicle registration tax (ECOSCORE)		X	X	X
TR-C04: Specific support for the manufacture of clean vehicles			X	
TR-C05: Best available technology in public transport			X	X
TR-D: Biofuels				
TR-D01: Biofuel tax exemption	X			

ly-friendly coolants (see IP-A06). An ecological premium can also be obtained for the installation of new cooling applications with environmentally-friendly coolants.

IP-C01 and IP-C02 Reduction of N_2O emissions in the nitric acid and caprolactam industries

N_2O emissions from nitric acid production come from several sites. As a first step, the Flemish Region and the company management had concluded an Agreement with a view to a substantial reduction in emissions on the Flemish sites and having recourse in particular to a catalyser developed by that company.

Since 2011, an agreement has also enabled similar emission reductions to be achieved in Wallonia. This agreement took the form of a domestic "joint implementation project".

N_2O emissions from the production of caprolactam are located in Flanders and come from one manufacturer. The company has already undertaken several concrete initiatives to cut nitrous oxide emissions. A study has also been conducted on available emission reduction technologies. According to the study, the prospects of significant medium-term emission reductions (via catalysers) are promising. Furthermore, the company has already reduced its emissions compared to the 1990 level by optimising production processes.

TR- Develop sustainable means of transport

A policy aiming to reduce greenhouse gas emissions from transport is to be based on the following 3 priorities:

1. reduce mobility needs by encouraging, for example, tele-working, video conferences or by reducing distances between home, work and leisure areas;
2. if travel is unavoidable, ensure that it is undertaken with the most ecological means of transport: walking or cycling for short journeys, public transport for the longer distances;
3. if a road journey is absolutely essential, encourage users to drive flexibly, respecting the environment, to purchase efficient vehicles, to group several people together in the same vehicle when the opportunity arises.

Two aspects in particular are developed in the National Climate Plan:

- the promotion of modal shifts, whether to replace journeys by private car by the use of public transport (train, bus, underground) or to develop the transport of goods by rail or inland waterway;
- financial incentives directing users' choices towards vehicles with lower energy consumption.

TR-A01 / OB-C01 Mobility plan

Local mobility plans, either at town or municipality level or in conjunction with companies or public institutions (schools and the administration), are produced by all the federated entities. These local plans aim to optimise the journeys made by passengers and limit the use of fossil fuels.

For passenger transport, mobility plans include policies and measures aiming to improve public transport quality and provision, to encourage people to use alternatives to private cars to travel to work, to promote cycling, etc. These measures are based on adapting regulations on developing the road system, road signs, etc. enabling the commercial speed of public transport and the safety of vulnerable road users (pedestrians, cyclists) to be increased.

TR-A02 Improvement and promotion of public transport (TR-A02)

One of Belgium's priorities for mobility is to encourage intermodal transport through the promotion of public transport. The desire to diversify passenger and freight transport provision can be seen in additional measures taken at federal and regional levels. Major infrastructure projects are under way in conjunction with the various authorities (RER - regional express network) and the Diabolo project (creating a new railway line serving Brussels National Airport)) to boost transport capacity and service quality.

At Federal State level, the basic task assigned to the public companies of the SNCB/NMBS Group (railways) is twofold: promoting rail transport on the Belgian network, thus offering an alternative to other less environmentally-friendly means of transport, and guaranteeing a top-quality service so that rail traffic increases more than the general traffic increase in all forms of transport together.

In Flanders, home-workplace journeys are a short-term priority. The Commuter Plan (2005) contains information about the initiatives required for home-workplace journeys. Public transport in Flanders is also being developed further and improved, including through necessary infrastructure works. The necessary awareness-raising campaigns are also taking place (see chapter on awareness-raising). A range of public transport promotion measures have been taken in Wallonia. These measures include free travel for children up to the age of 12, a 50% reduction on travel passes for those in education up to the age of 24, special measures for people returning registration plates to the vehicle registration authority, etc.

Apart from information about the bus service provided, the TEC[29] transport information centres provide information about different transport options in Wallonia, including partnerships with taxi companies, Cambio (promotion of car-sharing), cy-

[29] Public transports companies are named "TEC" in Wallonia, "De-Lijn" in Flanders and "STIB/MIVB" in Brussels

cling, combined TEC-SNCB, TEC-STIB, TEC-De Lijn travel passes, exchanging a vehicle's registration plate, etc.

Public transport alone – however efficient it may be – cannot meet all travel requirements. The STIB therefore has an intermodal transport policy in the Brussels Capital Region which constantly seeks to ensure that public transport and other means of transport complement each other.

Since 2006, the Region has been offering the Bruxell'Air premium to Brussels residents who hand in their registration plates. The incentive is worth EUR 525 and encourages residents to give up their cars and scrap old cars which emit pollutants. The Bruxell'Air premium comprises a public transport travel pass and/or a bicycle purchase voucher, combined with a Cambio (car-sharing scheme) subscription. Over the course of a year, over 1 500 Brussels residents will have received the Bruxell'Air premium.

The cornerstone of these measures is the offer of free home-workplace transport for users (TR-A08) and government employees (OB-C02).

The profile of public transport is also raised by conveying an image of sustainability which is based on using the best available technology (see TR-C05).

Finally, road traffic regulation measures are implemented to give public transport priority in urban centres and therefore make it a more attractive option compared to cars (TR-A05).

TR-A03 Promotion of the use of bicycles

Cycling and walking are particularly recommended for short journeys (under 5 km) as a replacement for car travel.

The Federal Government has been encouraging cycling through tax incentives since 1 January 1998. The allowance paid by employers to employees for home-workplace bike journeys is now exempt from tax and social security contribution up to a maximum of EUR 0.15 per km. In March 2010, the maximum amount exempt was set at EUR 0.20 per km and will henceforth be indexed. For 2013, this corresponds to an amount of EUR 0.22 per km.

The acquisition and making available of service bicycles, intended for work travel or home-workplace journeys by staff, and the maintenance and repair of the bicycles can be the subject of a deduction increased by 120%.

Particular attention was paid to promoting cycling in the Infrabel and SNCB management contracts (and in the business plans). Accordingly the authorities obtained pledges to increase the number of cycle spaces and to optimise surveillance of cycle shelters, the development of 'cycle hubs' in railway stations and also space to provide bike hire, bike repair and other bike related services offered to social economy companies.

The three regions have implemented a range of measures to promote cycling:

- an investment programme for the building of cycle tracks along regional roads;
- bicycles being allowed to travel in both directions in one-way streets;
- setting up a certain number of appropriate facilities (dedicated cycle spaces, cycle hire points and small repairs centres) particularly at the main stops and public transport stations;
- the construction of a network of itineraries reserved for pedestrians, cyclists, persons with reduced mobility and horse riders;
- in various towns, in order to promote occasional journeys by bicycle, a system for hiring bicycles located in the street has been introduced.

In the Federal administration and that of the Regions, government employees are given a mileage allowance for (part of their) home-to-work cycle journeys (OB-C03).

TR-B03 Promotion of tele-working

Tele-working helps to reduce road traffic at peak times (congestion) as the worker stays at home and is more effective than a worker who lives a long way from his or her workplace. Tele-working is encouraged in cooperation with the social partners.

Each authority (federal and in the 3 Regions) offers a tele-working formula to its staff.

TR-B05 Eco-driving

In application of Directive 2003/59/EC, transposed into Belgian law by Royal Decree of 4 May 2007, the introduction of the 'certificate of professional competence' for the driving of vehicles aims to bring about a behavioural change in the driving style of drivers, including professional drivers. The principles of eco-driving (appropriate speed, suitable gear changes, sensible use of accessories, correct tyre pressure, etc.) should become automatic and should be applied on a daily basis by the driver.

After having already integrated eco-driving into the content of the lessons and test for the bus and coach driving licence (Group D) in September 2008, eco-driving was extended to the theory and practical lessons and the driving test for lorries (Group C) in September 2009.

Initiatives are in progress targeting the general public, specific groups (such as sales representatives or professional drivers) and the public authorities (e.g. training for municipal workers).

The Regions have, to varying degrees, acquired the necessary technical devices and have developed training, which so far has focused essentially on professional drivers (lorries or public transport). They sometimes encounter budgetary problems in ensuring that their plans are developed to the full.

TR-C03 Evaluation of vehicle environmental impact (Ecoscore) and reform of road tax and vehicle registration tax

This measure in fact comprises two separate aspects:

The Ecoscore aspect:

The promotion of more environmentally-friendly vehicles in all aspects (CO_2 and other pollutants) reinforces these measures at regional level. This evaluation is carried out in particular through the Ecoscore system, which classifies vehicles based on their potential environmental impact. The various harmful effects of a vehicle (greenhouse effect, noise pollution, air quality, impact on health and ecosystems) are factors used to determine its Ecoscore.

NB: The purchase of environmentally-friendly vehicles forms an integral part of the exemplary role of the public authorities (OB-C07) and is included in the terms of sustainable contracts (OB-A01).

The tax aspect:

This aspect has been extended and now covers inter-regional cooperation with a view to amending all regional taxation relating to road transport.

On 21 January 2011, a political agreement was concluded between the three Regions with a view to a reform of road tax. This agreement provides that, with due regard for the particularities of each Region, the latter agree to cooperate with a view to a reform of road tax consisting of:

1. The introduction for heavy goods vehicles of a toll system depending on the number of kilometres actually driven, instead of the 'Eurovignette' system currently applied in Belgium and consisting of a flat-rate user charge applied to heavy goods vehicles for the use of the major road infrastructure;
2. The introduction, prior to the possible implementation of a kilometre charge for light vehicles, of a time-based charge for use of the road infrastructure, applicable to light vehicles – the electronic vignette. To ensure that this system is fair, this flat-rate time-based user charge will also have to be applicable to foreign vehicles driven on the Belgian road network so that all users of the road infrastructure contribute to its cost;
3. The introduction, simultaneously with the user charge, of new methods to calculate the road tax and vehicle registration tax, which must lead to 'greener' taxation, reduce the burden and environmental impact of traffic and internalise the costs associated with road use. The tax will be based on environmental parameters. It will be set in accordance with the emission of CO_2 and the main pollutants (microparticles, NO_x, noise, etc.).

According to the agreement, the aim of the road tax reform is to introduce fairer taxation, to improve mobility and air quality and to increase the environmental efficiency of the transport system in the three Regions.

With a view to implementing this agreement, the Regions have set up a joint technical committee with the task of implementing the cooperation and coordination aspects between the three Regions and of examining the concrete terms and conditions of the systems.

In August 2011, the study contract on the reform of road tax was awarded to the Fairway consortium. A policy committee (CICP) and an administrative committee (CICA) with twelve working groups have analysed the various facets of the project. A 'provisional architecture' was approved at the end of July 2012 by the three regional governments. After consultation of the stakeholders, followed by market consultation, a 'final architecture', taking account of the comments made by the European Commission which was consulted, is to be delivered shortly. On the basis of the 'final architecture', specifications will be drawn up and a single service provider (SSP) will be appointed. The project preparation by the SSP will start in mid-2014, with the actual launch at the end of 2015 or during 2016.

TR-D01 Biofuel tax exemption

In agreement with European legislation concerning the promotion of biofuels, Belgium has taken several initiatives:

- The production of biofuels is subject to specifications laid out in a law on biofuels dated 10 June 2006, which in particular sets environmental (the best possible greenhouse gas results, improved energy efficiency across the sector), agronomic (lowest doses of pesticides and fertilisers) and distance criteria (shortest distance between the biomass production area and production unit), etc.;
- Upon those criteria, the authorities approved the production and marketing of biofuels by a limited number of producers, selected through a call for applications;
- The Federal Government authorised tax exemption of certain quantities of bioethanol and biodiesel and prescribed amounts of biofuels to be incorporated to gasoline and gasoil offered on the market.

Nowadays, those regulations are reviewed and will be updated to respect new criteria established by the European Union. Those notably consider incorporation rates of 6% in diesel oil, up to 9% in gasoline E10 and 4% in gasoline E5 (% in volumes). It also opens the door to the possible production and incorporation of 2nd generation biofuels.

In this changing framework, Belgium has obtained from the European Commission the authorization to organize a 1-year progressive phasing-out of the tax exemption and a progressive switch to new production and marketing prescriptions.

TR-C01 / TR-C02 / OB-A01 / OB-C07 Purchase of new, energy-efficient vehicles

As part of the revision of the European Directive (1999/94/EC), the Federal Government is taking all the necessary measures to correctly apply the Royal Decree of 5 September 2001 aiming to reinforce and check the legal provisions regarding the wording in advertising of fuel consumption and CO_2 emissions in order to achieve the planned cut in CO_2 emissions. The annual publication of the Guide CO_2 de la voiture - Roulez économe… un plus pour vous et la nature (CO_2 car guide – energy-efficient driving – good for you and for the environment) enables citizens wishing to purchase a new vehicle to obtain objective and comparative information on the different models available on the Belgian market.

The Federal Government is also responsible for various tax measures:

- The *worker* who benefits from a company car pays a tax on the benefit in kind. Since 1 January 2012, this tax no longer takes account of the distance from home to workplace, but is calculated according to the CO_2 emissions and the catalogue value of the vehicle.
- Since 1 January 2005, for each company car with private use, a solidarity contribution is payable by the employer in the form of a CO_2 tax calculated on the basis of the type of fuel and the CO_2 emissions of the car. Since 1 January 2012, the calculation formula for the annual contribution has been revised.
- Also on the *employer* side, new measures have come into force since 1 January 2012 concerning the deductibility of costs: deductibility for tax purposes of company cars depends more on CO_2 emissions.

In Wallonia, an eco-tax incentive has been applied to the purchase of a vehicle by any private individual since 1 January 2008. Company cars are not covered by the measure.

Since 1 January 2013, it comprises the following:

- a bonus of between EUR 2 500 and EUR 250 is granted to the buyer where the vehicle's CO_2 emission rate is between 0 and 70 g of CO_2;
- a penalty starting at EUR 100 where the vehicle's CO_2 emission rate exceeds 145 g of CO_2 and reaching EUR 2 500 where the vehicle's CO_2 emission rate exceeds 255 g of CO_2.

The Flemish Parliament also adopted a Decree on 15 February 2012 reforming the vehicle registration tax for natural persons. This is applicable since 1 March 2012. This tax is differentiated on the basis of CO_2 emissions and the Euro standard. Furthermore, this Decree promotes the acquisition of cars running on natural gas (CNG) and LPG.

TR-A04 Promotion of multimodal systems for freight

The development of multimodal platforms is a key measure for freight and is also contingent upon improving water and rail transport.

In this respect, the Federal Government supports the European Commission's NAIADES programme promoting inland waterway transport specifically through tax exemptions on the capital gains made on vessels used for commercial transport. The measure contains environmental conditions and therefore also helps to improve the ecological performance of inland waterway transport. The Federal State also supports combined transport in Belgium via an aid mechanism for combined freight transport operators using railways for distances under 300 km.

In the Flemish Region, Flanders Land Logistics is making further efforts to optimise the logistics chain, improve distribution with dense coverage, encourage initiatives relating to green logistics/reverse logistics and maintaining and attracting logistics activities with high added value. Firms are supported (including via logistics consultants) in their search for sustainable alternatives. The necessary support tools, such as a green logistics road map, a simulation model to optimise the timing of goods flows by road, best practices concerning green logistics, advantages and disadvantages of the use of emission tools, etc., are developed for this purpose. Provision is also made for support through logistics consultants.

The 3E Inland Waterway Transport Plan and the Flanders Mobility Plan currently being drawn up provide for incentive measures for inland waterway transport. The Flanders Inland Shipping Network (FISN), the 3E Inland Waterway Transport Agreement and the 3E Inland Waterway Transport Plan also work towards more environmentally-friendly inland waterway transport.

In Wallonia, on 15 March 2007 the government decided to review legislation on economic aid for inland waterway transport in order to encourage this mode of transport. As part of the Marshall Plan, the Region set up a logistics and transport hub to provide assistance to companies wishing to switch to multimodal logistics using more environmentally-friendly means of transport (rail and waterway). Moreover, the Walloon Region planned major investment (EUR 60 million) for the 2007-2010 period in order to develop several multimodal platforms (inland waterway, rail and road) in Liège, Sambreville, Charleroi and Garocentre (La Louvière) and network development and adaptation work.

The Brussels Capital Region is seeking to promote the inland waterways for freight transport. The Port of Brussels is aiming to take charge of 27% of the Region's freight transport via the introduction of its management plan approved in April 2006. The Region is encouraging rail-waterway combinations, further strengthening links with the major European ports without transfers and increasing the waste transport role of inland waterways in order to achieve this objective.

Measures to improve the efficiency of freight transport (cutting traffic jams and loading/unloading problems, dedicated parking areas, logistics centres, etc.) are also reinforcing these provisions (see TR-B04).

AG: Prioritise sustainable management of agricultural and forest ecosystems

This section comprises the fight against emission of greenhouse gases in the whole agricultural sector in Belgium and measures directed at increasing or maintaining the role of carbon sinks of the forest ecosystems or to encourage their adaptation to climate change.

Apart from the use of fuels in greenhouses, greenhouse gas emissions from agriculture are greatly influenced by the measures that the Member States will have to introduce under the European common agricultural policy, which is currently undergoing in-depth revision.

Table 4.8 Clusters and measures for agriculture and forestry

Clusters and measures				
Agriculture and forestry	Bodies responsible			
	Federal	Flemish	Walloon	Brussels
AG-A: Rational use of energy in agriculture				
AG-A01: Rational use of energy for greenhouse crops		X		
AG-A02: Financial support for rational use of energy in agriculture		X	X	
AG-B: Limitation of CH_4 and N_2O emissions				
AG-B01: Limitation of emissions from fertilisers and manure		X	X	
AG-C: Maintaining the carbon storage potential in forests				
AG-C01: Restricting deforestation and encouraging reforestation		X	X	
AG-C02: Preserving the ecological stability of forests		X	X	
AG-D: Biomass production for energy purposes				
AG-D01: Wood-Energy Plan			X	
AG-D02: Promotion of dedicated energy crops		X	X	
AG-D03: Specific support for the biogas industry			X	
AG-D04: Quality standards for fuels	X			
AG-E: Horizontal measures				
AG-E01: Biomass Observatory	X	X	X	X

AG-A01 Rational use of energy for greenhouse crops

In the Flemish Region, measures have been taken to reduce CO_2 emissions in the agricultural and horticultural sectors. They principally concern crops grown in greenhouses, which are very important in the north of the country. First and foremost, the rational use of energy is promoted through the use of various best available technologies and supported by the Flemish authorities via financial instruments, energy consultants, supply of technological services, etc. For the energy demand remaining after the rational use of energy measures, further efforts are made towards the maximum promotion and financial support for the use of various renewable energy sources (solar, wind, biomass, green cooling or heating, residual heat). The impact of the use of fossil fuels is limited as far as possible by replacing (heavy) fuel oil where possible by natural gas and the combination of fossil fuel with sustainable technologies.

As most of the greenhouses are located in the north of the country, Wallonia is little affected by CO_2 emissions from fossil fuel consumption. However, there is a specific Walloon aid scheme for installation of greenhouses with high energy efficiency.

AG-D01 Wood-Energy Plan

In the Walloon Region, there has been a Wood-Energy Plan since 2001. It aims at setting up in the Walloon territory some ten projects for automatic heating systems using wood, gas generators or other technologies modified to make use of the energy value of wood. This plan affects essentially municipalities and local government with or without connection to the heating network.

By June 2012, the Plan had supported 45 installations for a total power of 11.3 MW and 7.6 km of heating network. It plans to support 44 additional projects for a total power of 9 MW and more than 10 km of network.

AG-B01 Limitation of greenhouse gas emissions from fertilisers and manure

In the **agriculture sector**, the bulk of the measures concern cultivation practices and inputs rather than energy consumption and are therefore based on the existing policies with regard to the sustainable nitrogen management programme, the agri-environment measures and the conditions under the common agricultural policy (CAP).

In Wallonia, a further decline in the total livestock is expected, which will naturally continue to reduce the burden on the climate. Apart from the Rural Development Plan and the Nitrates Directive mentioned above, farmers (in both Flanders and Wallonia) also have to comply with cross-compliance conditions, including in particular that no permanent grassland can be ploughed up, that the farmer must have analyses carried out at regular intervals of the carbon content and acidity in his fields and that measures to combat erosion must be taken with regard to parcels which are particularly prone to it.

Several agri-environment measures also make a significant contribution to reducing organic or mineral nitrogenous inputs, such as, for example, the ban on adding mineral fertiliser for the ‘grass headlands’ ‘extensive field strips’ and ‘crop strips’ measures. The ‘low stocking rate’ measure has a direct impact on the organic nitrogen inputs, indirectly reflected in the inventories via the reduction in livestock. The measures to reduce inputs in cereals, natural grassland and grassland of high biological value also contribute to reducing inputs of mineral nitrogen. Finally, the winter cover of the ground avoids nitrogen losses and therefore limits subsequent inputs.

In Flanders, further efforts are also being made regarding awareness-raising and information on and further research into the optimisation of the feed composition and the addition of additives to reduce methane emissions through digestion (cattle) and nitrous oxide and methane emissions from manure storage (cattle, poultry and pigs). In addition, further efforts are made regarding the application of good manure storage practices, the development of air scrubbing systems (filters) in stall and manure storage systems, the (financial) promotion of biogas installations, etc.

Cluster AG-C (AG-C01, AG-C02) Maintaining the carbon storage potential in forests

In Wallonia, the Forestry Code (Decree of 15 July 2008) has introduced a certain number of constraints in favour of forest conservation and the maintenance of ligneous materials and carbon, including:

- the abolition of inheritance duty on the stumpage value, which encourages more ecological forestry choices (maintaining the material, greater possibility to choose species with a long life cycle and continuous processing, etc.);
- the restriction of clear-cutting;
- the obligation to plant species suited to the location, which contributes to limiting the risks of blowdown and dieback and improves resistance to climate change;
- the creation of entire reserves;
- the limitation on drainage (which encourages maintenance of organic matter);
- incentives for production of high quality wood and therefore use of wood in long-term applications with gains in CO_2 linked to substitution by other materials.
- treatment standard in even-sized spruce stands of 2009. This new standard is part of more dynamic forestry than that practised in many places. The aim behind the desire for renewed dynamism in forestry regarding the main coniferous species existing in Wallonia is mainly to produce timber in stable, healthy stands, with higher biodiversity and a shorter life-cycle. In the context of global warming, these advantages linked to the dynamism of the clearings can only be beneficial to production, by limiting the disadvantages suffered from pronounced droughts or more numerous beetle populations, for example.[30] In addition, increasing the dynamism of forestry of both coniferous and deciduous trees contributes to increasing the proportion of wood in long-term uses and therefore storage in wood products.

The designation of 1 500 km² of forests in Natura 2000 under special fixed rules of management also contributes to these various objectives.

[30] de Potter B., 2011. Prise en compte des changements globaux pour la gestion des pessières en Wallonie [Taking into account global changes in the management of spruce in Wallonia]. Forêt Wallonne 114: 17-25

The Flemish Region has an active forest expansion policy. The Flemish authorities have drawn up a strict regulation for optimum conservation and protection of the Flemish forest (Forest Decree of 13 June 1990 and Decree of 18 May 1999 concerning the organisation of spatial planning and Decision of the Flemish Government on 16 February 2001 to clarify the rules concerning compensation and deforestation and exemption from the ban on deforestation). As a general rule, deforestation is prohibited. There are a number of exceptions, but a permit is required in each case and this permit will be granted only in exchange for compensation. The obligation for compensation consists of the planting of a forest of equal size or larger at another location.

The compensation can also be financial in the form of a forest maintenance contribution to the Forests Compensation Fund. In addition, the Flemish authorities have created instruments to ensure the biodiversity and sustainable use of natural resources. In various cases, planting of forests is subject to acquiring a nature permit in the case of protected (open) vegetation (Decree of 21 October 1997 concerning nature conservation and the natural environment; Decision of the Flemish Government of 23 July 1998 establishing the rules for the implementation of the Nature Conservation Decree) or the planting of forests in agricultural areas (Rural Code of 7 October 1886).

Measures are being taken to preserve the ecological stability of the forests by reinforcing the concept of sustainable management of the forests in forestry practices. The application of the European Directive on the preservation of habitats (Natura 2000) goes in the same direction, namely preservation of the forest.

This may take the form, for example, of promotion of systems of forest certification.

On 18 November 2005, the Federal Government concluded an agreement relating to a circular on sustainable wood (also see OB-A01). This circular required that as of March 2006 under their procurement policy, the federal authorities may only buy certified wood coming from forests under sustainable management. For this purpose, the circular sets criteria which must be satisfied under the wood certification systems. A number of actions have been taken by the Federal Government to prevent the importation and the marketing of wood felled illegally and to strengthen the controls and penalties imposed on this trade.

The Walloon Region is committed to PEFC certification of sustainable forest management. Certification is a tool to permanently improve management at the regional level and the practices on the ground. It makes it possible for the interested actors from near or far to meet and form a consensus on forest management: owners, industrialists, scientists, environmentalists and users. Certification also makes it possible to provide a guarantee to the consumer that use of the wood goes hand in hand with good management of the forest. At present, more than 80% of the publicly-owned forests managed by the Division of Nature and Forests are PEFC certified.

Also in Wallonia, the Walloon Forest Health Observatory (OWSF), inaugurated in April 2011, is a powerful tool for the evaluation and phytosanitary monitoring of the Walloon forests in the short and long term. In the specific context of global warming and conserving biodiversity, the OWSF intervenes by proposing rapid solutions in the case of health problems, disasters, proliferation of parasites or pathogens or any other problem likely to affect the Walloon forests. Health monitoring is the basic principle of phytosanitary forest observation since it enables a problem to be registered as soon as it is observed. Forest health is obviously considered throughout the territory and covers both public and private forests.

In the Brussels Capital Region, the Forêt de Soignes/Zoniënwoud is FSC certified. Its management aims to ensure ecological stability. In addition to ensuring the ability to regenerate, biodiversity and ecological and social aspects are taken into account.

The Flemish authorities have developed various instruments to ensure biodiversity and sustainable use of natural resources (protection of vegetation and landscapes). Group certification under the FSC system has existed in Flanders since 2008, which is open to all forest owners who have a detailed forest management plan according to the criteria set by the Flemish Government for sustainable forest management.

WA: Continuing efforts in managing waste

The section 'Continuing efforts in managing waste' covers the measures to reduce greenhouse gas emissions during all stages of waste management, from prevention of the quantities of matter thrown away to final disposal in landfill.

Here the climate policy of the Regions is based directly on the waste management plans they implement.

WA-A01 Minimise quantity of waste into landfill

The actions in this field relate to prevention (including recycling, repair, etc.) and the management of the flows intended for landfill.

In Belgium, the prohibition of landfilling organic waste is in force. All the existing landfills still controlled are equipped with systems for biogas recovery, usually for the purpose of electricity generation. The old landfills are under surveillance which may lead, if necessary, to the installation of safety flares.

WA-B01 Optimisation of incinerators

All household waste incinerators are equipped with electricity-generating steam turbines. In Flanders, such production is eligible for the granting of green certificates.

Table 4.9 Overview of the purchase initiatives of the Federal Government and the three regional governments for the first commitment period (2008 – 2012)

Government decisions	Initiative	Target Group	Original Budget
Federal Government			
13 May 2005	First JI/CDM tender	Primary market	EUR 13 million
24 February 2006 / 16 February 2007	Second JI/CDM tender	Primary market	EUR 22 million
24 February 2006 / 16 February 2007	Agreement with KfW Bankengruppe	Secondary market / Carbon Fund	EUR 25 million
27 June 2008	Green Investment Scheme	Annex-I countries	EUR 30 million
9 May 2008 / 19 December 2008	Third JI/CDM tender	Secondary market / Aggregator	EUR 100 million
24 November 2008	China Partnership	Governments	EUR 10 million
		Total Revised Budget Federal Government	**EUR 167.7 million (2005 – 2014)**
Brussels Capital Region			
November 2004	CDCF World Bank	Carbon Fund	**USD 9.5 million[31] (2005 – 2014)**
Flemish Region			
Funds			
20 October 2006	Multilateral Carbon Credit Fund (European Bank for Reconstruction and Development (EBRD) and European Investment Bank (EIB))	Carbon Fund	EUR 22 million
8 December 2006	First Tranche of Carbon Fund for Europe (World Bank, EIB)	Carbon Fund	EUR 10 million
22 June 2007	Asia Pacific Carbon Fund (Asian Development Bank)	Carbon Fund	EUR 20 million
Individual projects			EUR 3.4 million
xx/xx/xxxx	JI/CDM tender	Secondary market	EUR 8.25 million
		Total Revised Budget Flemish Region	**EUR 63.65 million**
Walloon Region			
23 December 2004	CDCF World Bank	Carbon Fund	**USD 5 million[32] (2005 – 2014)**

[31] Using an exchange rate of 1EUR = 1.3USD, this equals ± EUR 7.3 million.
[32] Using an exchange rate of 1EUR = 1.3USD, this equals ± EUR 3.85 million

Use of the Kyoto mechanisms

(First commitment period: 2008 – 2012)

Belgium uses the Kyoto mechanisms to fulfil its target under the first commitment period of the Kyoto protocol (2008 -2012). This political decision was transposed in Belgian national law on 19 February 2007 by a Cooperation Agreement between the Federal Government and the three regional governments.

This cooperation agreement includes the official designation of the National Climate Commission as the Belgian DNA and the Belgian Focal Point, as well as the transposition of Directive 2004/101/EC and some provisions of the Kyoto Protocol related to the use of the mechanisms (eligibility requirement, commitment period reserve, banking, limits on sinks credits, etc.). The cooperation agreement entered into force on 26 March 2007 after approval by each of the four federated assemblies (by the federal parliament and the parliaments of the three regions).

Further to the Cooperation Agreement, the Federal Government and the regional governments each have their own legislation, operational programmes and institutional decisions in place for the use of the Kyoto Mechanisms.

Federal Government

According to the national burden sharing agreement of the Belgian Kyoto target, the Federal Government is to buy 12.2 million carbon credits. The budget for the purchase of these credits is provided by the so-called "Kyoto Fund". This fund was established in 2003 (Royal Decree of 24 March 2003). The revenues come from a levy on electricity use established to finance several public service obligations.

The objective of the Federal Government is to purchase in priority credits from CDM and JI projects. The purchase of credits through the International Emissions Trading (IET) was only an option from 2008 onwards (as defined in the national burden sharing agreement).

The Brussels Capital Region

The legal basis for the use of the Kyoto Mechanisms is the Code bruxellois de l'Air, du Climat et de la Maîtrise de l'Energie (M.B., 21 mai 2013, p. 28357).

The Brussels Capital Region intends to use only the Clean Development Mechanism (CDM).

The Flemish Region

The legal base for the use of the flexible mechanisms is established in the so called 'Energy Decree', which was adopted by the Flemish Parliament on 8 May 2009. The Flemish government defined the Flemish approval procedures for project activities, together with the acquisition procedures for both private entities as well as the Flemish Government itself. On 27 April 2012 the Flemish Government decided to establish a Flemish Climate Fund to finance internal climate policies as well as the acquisition of Kyoto Units.

The decision of the Flemish Government on the use of the flexible mechanisms of the Kyoto Protocol defines the Flemish acquisition strategy. In first instance, the Flemish Region will make use of the project-based flexible mechanisms (CDM and JI) and will acquire Kyoto-units which arise from a known or tested investment or project activity. From 2008, the Flemish Region can also proceed to the direct purchase of project-related Kyoto-units on the international market. If it becomes clear that the budgets provided are not sufficient to make up the remaining gap in reductions, other acquisition channels with a probably lower cost price could also be used in last instance. The Flemish Re-

Table 4.10 Planned use of Kyoto Mechanisms by the Federal Government and the three regions during the first commitment period (2008 – 2012)

Entity	Type of Flexible Mechanisms (IET, CDM, JI)	Total projected quantities for the 2008 – 2012 period (Mio units)	Allocated budget at government level (EUR Mio)
Federal Government	CDM, JI and IET (GIS)	12.207	167.7
Brussels Capital Region	CDM	0.155	7.3
Flemish Region	CDM, JI and IET (GIS)	17.000	63.65
Walloon Region	CDM	0.087	3.9
Total	**CDM, JI and IET (GIS)**	**29.449**	**232.9**

gion will purchase CERs and ERUs on the secondary market to bridge its remaining Kyoto gap.

The Walloon Region

The legal basis for the use of the Kyoto Mechanisms is the Decree of 10 November 2004 establishing a scheme for GHG allowance trading, creating Kyoto Funds and relating to the flexibility mechanisms of the Protocol of Kyoto. This Decree provides for the creation of a Walloon "Kyoto" fund whose receipts can be used to purchase project based credits (CDM or JI) or to purchase emission credits (International Emissions Trading).

At present the Walloon Region uses only the CDM (through the CDCF) but if there is a need to buy more credits, it could consider all the flexible mechanisms.

Table 4.10 provides an overview of the planned use of Kyoto Mechanisms by the Federal Government and the three regions.

4.3.3. Evaluation of the measures' impact on GHG emissions

Preamble

Each of the National Climate Plan measures aims to reduce our greenhouse gas emissions. They are government measures aimed at changing the behaviour of socio-economic actors. In the long term, their overall impact should be shown in the year-to-year evolution of emissions per sector as stated in the emissions inventories. However, although surveying the inventories will determine whether Belgium or its regions are close to meeting their reductions targets, this will not isolate the individual impact of each measure or separate the effect of the plan's measures from that of the "natural" evolution of the country's socio-economic activities for reasons other than having implemented the plan's measures.

Consequently, it is not possible to identify the individual impact of each of the plan's measures. This may be due to a number of circumstances:

- Some measures cut across all sectors and their impact is almost impossible to evaluate, such as awareness campaigns targeting the general public.
- Although the effectiveness of certain measures can be evaluated, this does not enable us to directly deduce their impact on emissions: a measure aimed at limiting parking supply in a city centre should eliminate a certain number of cars from the traffic, but it is impossible to evaluate the distances these cars had travelled beforehand. Drivers who no longer use their car use another means of transport, but we don't know which one. It could be that they simply stopped using this type of transport.
- Implementing certain measures results in the adoption of traceable economic actions, such as purchasing equipment or applying for subsidies for investment in energy-saving equipment. In this instance, if sales or subsidy statistics are available, as well as an estimate of the energy savings and the resultant reduction in emissions, the impact of the measure can be estimated. This would nonetheless be approximate, given the uncertainties generally associated with estimating unit savings. Furthermore, it does not take into account all the reductions achieved by using such equipment, since some economic actors will have acquired it without applying for a subsidy.
- In some cases, a series of complementary measures are implemented that share the same objective. For example, to achieve a reduction in commuting journeys by car by promoting a modal shift towards public transport or alternative modes of transport such as walking or cycling, there needs to be an improvement in the provision of public transport (frequency, regularity, comfort, tariffs, zones served, connections etc.) and in access to and availability of parking around major public transport stations and hubs, while at the same time regulating or even limiting parking facilities in congested urban areas. Although it is possible to evaluate the impact of all these measures on the basis of the statistical trends in public transport usage, the impact of each of these measures cannot be separated from the cluster as a whole, which shares the same objective.
- Finally, certain measures or certain clusters of measures actually constitute development policies. This is true of the green certificate (and/or CHP) systems aimed at developing electricity generation using renewable energy sources or high-efficiency cogeneration. It is also true of emissions reductions policies that originate from the industrial sector (ETS and voluntary agreements such as sectoral and benchmark agreements). In this instance, policy-makers have established monitoring indicators that enable an overall evaluation of the impact of their implementation.

Several factors influence our analysis, in particular:

- There are various uncertainties affecting the impact estimates, mainly to do with the baseline used to estimate the energy savings achieved as a result of the measure and the emissions consequently avoided. For example, it is estimated that insulating the roof of a residential home can reduce the fuel consumption used to heat the property by between 20 and 30%, but we only have a very rough estimate of an individual home's average consumption. By way of further example, we can observe and quantify the rise in railway usage, but cannot guarantee that this increase can be attributed to the plan's measures.
- Duplications and double counting must be avoided: at one time, the acquisition

of energy-saving equipment benefited from investment subsidies, but this was also eligible for tax relief, i.e. two mechanisms with the same objective. The two mechanisms complemented each other but the investment in reducing emissions was only made once. For example, when evaluating the impact of a policy of voluntary agreements in industry, care is taken not to add to this the impact of tax relief for energy-saving investments, given that a large number of tax relief applications come from companies engaged in such agreements.

Other phenomena can affect the impact of the measures, but their effect on estimating this impact cannot be taken into consideration here:

– The "windfall" effect: the measures implemented apply to all actors, even those who had already adopted the actions sought by the measure. For example, paying for the public transport commuting costs of public sector staff certainly encourages a modal shift from the car to these means of transport, but it also benefits the people already using this mode of transport before the measure was implemented. If a distinction between these two categories of user cannot be drawn, an evaluation based on the number of season tickets paid for risks overestimating the desired impact.
– The multiplier effect: When people achieve energy savings the example they set can generate other initiatives among these other people, even if they do not decide to apply for investment grants or tax relief. Given that our estimates are based on financial incentive application statistics, we will not cover these initiatives. In the same vein, it should be noted that the technical requirements for approving a grant can dictate how the technical measures are implemented. Thus, previously, a roof insulation installer invariably installed a thickness of 8 cm. Now that eligibility for an insulation grant requires a maximum coefficient of heat transfer to the insulated wall, a thickness of 20 cm is automatically installed.
– The rebound effect, where a device that consumes little energy tends to be used more often or in a more lax fashion. A well-known example is that of low-energy lamps that nobody takes the trouble to turn off.

The following conclusions can be drawn from these considerations:

– Impact estimates cannot be made for every measure of the plan.
– Where estimates are feasible, they will often be made for a series of measures (a cluster, for example) that share the same objective. Particular care must be taken to avoid double counting, and where this is unavoidable it should be identified.
– Estimates are marred by considerable uncertainties associated with the limited availability of data and the many assumptions that generally need to be considered to identify the baseline.
– It will be very difficult, if not impossible, to establish a link between the emissions reductions estimated here and the trends observed in the evolution of emissions inventories over time.
– In view of the large number of assumptions to consider participants must harmonise their work, together with the CONCERE Working Group, which is responsible for evaluating the impact of the plan's measures on improving energy efficiency, as required by the EU Directives 2006/32/EC and 2012/27/EU on energy efficiency and services.

Methodologies used

Estimating the impact of each measure requires an appropriate calculation method. Describing each of these methods in detail would be tedious and would needlessly generate innumerable extra pages. The following resources are available for further information:

Etat des lieux et évaluation de l'impact des mesures du Plan National Climat (Inventory and evaluation of the impact of the National Climate Plan measures), Report from the Policies and Measures Working Group of the National Climate Commission, Sept. 2011 (in FR)

Stand van zaken en evaluatie van de impact van de maatregelen van het Nationaal Klimaatplan, Verslag van het werkgroep Beleidslijnen en Maatregelen van de Nationale Klimaatcommissie, sept. 2011 (in NL)

VITO & ECONOTEC: *Evaluation of the greenhouse gas emission reductions resulting from policies and measures taken by the Federal Government,* Study for the Federal Public Service of Public Health, Food Chain Safety and Environment, 17 March 2012 (in English), http://www.climat.be/IMG/pdf/120317_draft_final_report.pdf.

Table 4.11 below outlines the approaches adopted by the different authorities in order to estimate the impact of the key measures.

Efforts have been made to draw on the widest possible range of available statistical data, in particular:

– statistics on green certificates (and CHP certificates) issued, CO_2 emissions avoided (and energy savings achieved through cogeneration)
– statistics on grants accorded and/or tax relief for energy-saving investments
– statistics on the use of various modes of public transport (train, metro, bus)
– the evolution of performance indicators (energy efficiency, emissions reductions) used to monitor the sectoral agreements in industry
– and so on

Efforts have also been made to ensure absolute consistency between the impact calculations in this chapter and the emissions projections made in the following chapter (chapter 5). In addition, with regards to the specific impact of financial assistance for improving the energy efficiency of buildings, care has been taken to apply the same methodologies as those used for the energy efficiency action plans (EEAP) required by EU Directives 2006/32/EC and 2012/27/EU on energy efficiency.

Table 4.11 Methodologies used to estimate the impact of the measures

	Measures		Methodology
EP-A01	Green certificates and CHP certificates systems	Wallonia	Data: number of green certificates delivered. Method: each certificate represents a fixed mass of CO_2 emissions avoided in a reference power plant (or boiler for CHP heat) Corrections: substract certificates allocated to installations existing before the green certificate system set-up Projections: in line with adopted objective to produce 8000 GWh of electricity from RES by 2020 (share of certificates by 2020 is fixed). Coverage: Walloon region
		Flanders	Data: number of green and CHP certificates delivered. Method: each certificate represents a fixed mass of CO_2 emissions avoided in a reference power plant (or boiler for CHP heat) Projections: in phase with expected growth of RES and CHP for electricity production in the WEM scenario Not included: Solar PV and biomass in coal fired central power plants (see EP-A03) Coverage: Flemish region
EP-A03	End of tax exemption on fossil fuels for power plants	Federal state	Data and method: electricity production from biomass injected in coal fired power plants Correction: considers impact in Flanders only as a complementarity contribution to EP-A01
EP-A05	Action plan for RES and CHP (offshore windfarms)	Federal state	Considers only offshore windmills. Data: installed power Method: assume annual number of average full load operating hours; assume CO_2 emissions avoided in reference power plant Projections: saturation of dedicated area by 2020 (2200 MW installed) Coverage: in addition to EP-A01
EC-A03	Energy performance of buildings	Wallonia	Data: number of new dwellings Method: improvement of unit annual mean energy consumption of dwellings when enhancing thermal regulation: K45 by 2008, Ew < 100 by 2010 and Ew < 80 by 2011. Projections: assume building stock increasing by 1.25%/year
		Flanders	Data: Number of new buildings Method: Criteria depend notably upon the type, age, and equipment of the dwelling. In brief: E-value of 100 by 2010, 80 by 2012, 70 as of 2014 and 60 as of 2016 In the subsector office buildings and education buildings: from E100 in 2006 to E80 in 2012 and E70 as of 2014 and E60 as of 2016. In the other subsectors: an E-level of 100 for the whole projection period Coverage: Flanders
		Brussels	Data: Number of new buildings and renovations Method: Criteria depend notably upon the type, age, and equipment of the dwelling. In brief: E-value of 90 by 2008 and 70 by 2011 (E 75 for tertiary sector) Coverage: Brussels Capital Region

	Measures		Methodology
EC-B01	Financial support to RUE and RES in the residential sector	Wallonia	Data: statistics of regional premiums Method: unit energy savings and unit energy consumption of average dwelling established according to dir 2006/32/EC comitology and CONCERE/ENOVER selection of parameters applicable to Belgium. Projections: in harmony with EEAP perspectives Coverage: Wallonia
		Flanders	Data: statistics of regional premiums for do-it-yourself roof insulation and RUE investments by social rental agencies (national tax deductions are not applicable for these investments) Method: unit energy savings and unit energy consumption of average dwelling established according to dir 2006/32/EC comitology and CONCERE/ENOVER selection of parameters applicable to Belgium. Projections: in harmony with EEAP perspectives Coverage: Flanders
		Federal state	tax exemption is stopped. Nevertheless, federal data projections are still used for 2015 and 2020, until practical experience shows the impact of that decision.
EC-B03	Specific support for RUE initiatives by low income persons	Federal state	Data: low interest loans available for low revenue people willing to improve the energy efficiency of their dwelling Method: to avoid double counting with effects of tax deduction (EC-B01), only non-taxpayers are considered.
EC-C01	Third party financing in the public sector	Federal state	FEDESCO is the 3rd Party financing company designated to improve federal buildings. Data: from FEDESCO reports Projections: from FEDESCO objectives Coverage: Federal buildings mostly located in the Brussels Capital Region
EC-C03	Specific measures in the medical, social and education sectors	Wallonia	Data: UREBA Programme, number of subventions per type and associated energy savings Method: data prepared by Univ. Mons-Hainaut Projections: identical number of requests every year Coverage: Walloon Region
IP-A02	Benchmarking and Long Term Energy/CO_2 efficiency Agreements in the industrial sector	Wallonia	Data: energy efficiency and CO_2 emissions indicators Method: indicators compare effective energy consumption/CO_2 emissions with an identical production situation in a baseline (without measure) situation. Correction: BAU savings are benefitting to the industris indicators. Substraction of BAU savings from total saving, assuming efficiency naturally improves by 0.5%/year. Projections: a similar improvement of both indicators is assumed up to 2020 Coverage: Wallonia
		Flanders	Data: Audit covenants yearly report: http://www.auditconvenant.be/docs/044%2019%20101130%20Jaarverslag%202009%20-%20goedgekeurd%20op%2030%2011%202010.pdf Benchmark covenants yearly report:http://www.benchmarking.be/docs/061-0046%20Finaal%20Jaarverslag%20CB%202009%20goedgekeurd%20op%2030%2011%202010.pdf Projections: No decision yet about a possible reconduction of the measure after 2012 Coverage: Flanders

	Measures		Methodology
IP-A06	Specific financial measures and ecology premiums for industry	Federal state	Data: tax deductions for enterprises investing in energy saving equipment Coverage: whole industry Double counting with IP-A01 or IP-A02
IP-C01	Specific agreement with nitric acid producers	Wallonia	Data from producer; Coverage: Wallonia
		Flanders	Data from producer Coverage: Flanders
TR-A01	Transports: Mobility plans at local level	Brussels	Compulsory mobility plans in medium and large size companies and administrations. Data: from regional mobility plan programme Method: assumption of 5% decrease of distances travelled by cars, 4% are substituted by public transports and 1% by bicycles and pedestrians Coverage: regulation applies on the territory of Brussels Capital Region but travels cover a larger area. Overlap with TR-A02 and TR-A03
TR-A02	Improve and promote public transports	Wallonia	Data: usage of busses and tramways Method: compute number of passenger. km (pkm); compare energy consumption per pkm by car and by public transport; assume all increase in attendance since 2004 is due to the measure Projection: follows objectives expressed in management contract of public transport company and assume that attendance remains constant after 2012. Coverage: Wallonia
		Flanders	Data: reference transport scenario (established in 2006) and WEM projections Method: difference between emissions/WEM projections and reference scenario; this includes not only TR-A02 but all transport measures Coverage: Flanders
		Federal state	Data: usage of trains Method: compute number of passenger. km (pkm); compare energy consumption per pkm by car and by public transport; assume all increase in attendance since 2004 is due to the measure Projection: follows objectives expressed in management contract of public transport company. Assume that attendance remains constant after 2012. Coverage: Belgium
TR-A03	Promote the use of bicycles	Brussels	Data: length of cycling lanes Projection: distances travelled by bicycle to increase linearly with the length of cycling lanes, assuming the increase generates a modal shift from car to bicycle. Coverage: Brussels Capital region
		Federal state	Tax deductions for travelling to work by bicycle Method: increase in bicycle use for home-work trips observed between 2005 and 2008 in an inquiry by the federal Mobility administration. This annual growth is applied until end of 2011. Projections: number of pkm by bicycle for home-work trips assumed stable (value from 2011).

	Measures		Methodology
TR-A04	Promote multimodal freight transport	Wallonia	Data: from administration of inland waterways Method: compares energy/CO_2 per tkm by ship and by truck. Takes into account road transport to and from the waterway. Projection: assume constant level up to 2020. Coverage: Wallonia waterways
		Brussels	Promotion of inland waterways at the Brussels canal harbour Source of data and projections: Brussels harbour Coverage: Brussels Capital waterways
		Federal state	Estimate considers rail transport only. Subsidies are available to support internal intermodal transport to help maintain existing rail traffic level and to increase it by 20% over a period of three years. Data: Number of ITUs (Intermodal Transport Unit: containers, swap bodies and semi-trailers suitable for intermodal transport) Assumption: without subsidies freight train traffic would disappear, except between Antwerp and Zeebrugge (where volumes are large) and to and from Athus (where distances are large), which respectively represented 57% and 12% of the total internal intermodal transport in 2007. Projections: applies to modal shift to rail transport only, assumption from 2011 to 2020: annual growth of number of ITUs: 6% Coverage: Belgian railways
TR-B01 TR-B02	Promotion of car-pooling Promotion of car sharing	Wallonia	Statistics and prospects of car sharing system "CAMBIO" Coverage: Wallonia
		Federal state	Income tax deduction for car-pooling to travel to work Method: assume 2 carpoolers are sharing the car. Assume carpooling max 3 days a week Projection: global evolution of the number of workers, based on the 2005-2008 evolution (before crisis)
TR-B05	Ecodriving	Brussels	Ecodriving training for public transport drivers Projection: linear increase of trained drivers between 2009 and 2020 Coverage: Brussels capital Region
		Federal state	Ecodriving as part of the training for the driving license exam (trucks and buses). Method: 5 to 7% savings on trucks and buses Effect reduced to 1% assuming only 40% of drivers concerned by 2012, 60% traffic on highways using cruise control (no effect), foreign drivers not concerned,...
TR-C01 TR-C02	Promotion of and tax deduction for the purchase of new clean vehicles	Wallonia	Statistics and prospects of the bonus-malus system Coverage: Wallonia
		Federal state	Tax reduction for low fuel consuming car fleet in enterprises Coverage: whole Belgium
TR-D01	Promoting biofuels	Federal state	Mix of 4% of biofuel by volume in petroleum fuel from July 2009. 10% by 2020 Coverage: Belgium
OB-A03	Environmental management system	Federal state	Method: assume a 5% decrease in heat and electricity consumptions.

	Measures		Methodology
OB-B01	RUE in public buildings	Federal state	Data: from 3rd party financing FEDESCO Projections: objectives of 15 000 m^2 by 2012, 1 km^2 by 2020 Overlap with EP-A01
OB-C02	Promotion of alternative transport in public services	Federal state	Data: public servants using public transports. Method: assume all increase of usage since 2005 is due to the measure. Overlap with TR-A02
OB-C04	Promoting telework in public services	Federal state	Data: from federal State Low impact
OB-C07	Purchase of clean vehicles by public administrations.	Federal state	Data: from federal administration Projections: objective of 50% of new purchase of vehicles are low emitting vehicles (max 145 g/km for fuel oil and max 160 g/km for gasoline)
-	Eco-cheques	Federal state	Impact of various energy saving equipment bought using Eco-cheques: i.e. low energy light bulbs, economy showers, …
-	Green loans	Federal state	1.5% reduction on interest rate of loans for RUE investments Overlap with EC-B01

Emissions reductions per cluster

The estimated impact of the measures' implementation is set out in the general table in paragraph 4.3.4 below. These estimates are for the year 2009; 2015 and 2020 are provided as outlooks. Table 4.12 sets out these estimates for the 4 main areas: electricity generation, industry, buildings and transport.

Impact per gas

The vast majority of these measures affect the CO_2 emissions of the sectors concerned. Exceptions to this are as follows:

- In industry, specific measures taken to reduce N_2O emissions from industrial processes in the production of nitric acid and caprolactam;
- In waste treatment, the recovery of landfill gases (CH_4) and its use as biogas to generate electricity;
- In the distribution of natural gas (CH_4), the gradual replacement of old cast iron pipes with steel or polymer installations;
- Measures to inspect and maintain refrigeration systems in order to limit fluorinated gas leakages;
- In agriculture, managing nitrates to reduce N_2O emanations, and reducing the number of bovine livestock, which in turn reduces CH_4.

In table 4.12 the evaluations of emissions reductions only covers CO_2 emissions except in the case of industrial N_2O emissions.

Actual emissions reductions in agriculture and in waste treatment are due to the measures that underpin the climate policy, but which are the result of implementing other sectoral policies such as the European agricultural policy and regional agricultural policies, as well as the regional waste management plans.

The impact of such policies can already be seen in the emissions inventories.

Long-term impacts

Many of the measures from the National Climate Plan concern support for investments whose effects will be sustained for several years, or even decades. The long-term impact of such measures is linked to the technical or economic service life of the equipment concerned.

This is especially the case for investment in infrastructure: building insulation, construction of new low-energy buildings and facilities, but also, for example, infrastructures that encourage modal shifts. Investments such as loading docks, broad gauge waterways, railway adaptations, and the purchase of rail machinery cover facilities with a service life in excess of 50 years.

For measures to upgrade the energy efficiency of heating and domestic hot water production facilities, average service life can be 20 years or more. This will also be the case for infrastructure that uses renewable energy sources, whose service life varies depending on the technology implemented.

In contrast, initiatives aimed at changing behaviour may need to be maintained, perhaps even renewed for several years, at least until a real change in mentality across all sections of society is visible.

4.3.4. Inventory table

Belgium's National Climate Plan consists of various measures, some of which reinforce each other and cannot therefore be evaluated individually. The large table in Annex 3 provides an inventory of these measures and their main characteristics. The effects of awareness and training measures are included in the measures they support and are not therefore listed in a separate evaluation.

The table contains one row for each measure of the National Climate Plan. Some measures have been added, including those that can already be regarded as planned by the regional authorities, even if they have not yet published their definitive climate plan for 2020.

Table 4.12 Impact of the measures per cluster

Domains of action		Clusters of measures		Estimate of mitigation impact (kt eq CO_2)		
				2009	2015	2020
EP	Energy production and conversion	EP-A EP-B	Environment friendly energy production Energy efficient electricity production	654	9 405	13 303
EC	Energy conservation in buildings	EC-A EC-B EC-C	Cross-cutting issues Residential sector Tertiary sector	2 3 553 55	72 992 286	147 1 828 488
IP	Reduce industrial emissions	IP-A IP-B IP-C	Energy efficiency in industry Reduce F-gases emissions Reduce N_2O emissions in industrial processes	2 119 2 705	2 242 3 361	3 876 3 361
TR	Sustainable transports	TR-A TR-B TR-C TR-D	Promote the intermodality of transport means Improve transports efficiency Promoting environmentally friendly vehicles Promoting biofuels	1 514 17 41 617	2 447 37 186 895	3 517 75 167 895
	TOTAL			**11 277**	**19 923**	**27 658**

4.4. Policies and measures that are no longer applied

For budgetary reasons, and since these are competences due to be transferred to the Regions as part of a constitutional reform currently underway, the Federal Government in 2012 abolished tax relief on energy-saving investments in private homes. Only roof insulation still benefits from such a scheme.

On 1 January 2012, the tax relief for "clean" vehicles was withdrawn for budgetary reasons.

4.5. Minimise adverse effects of response measures

Under Article 3.14 of the Kyoto Protocol and UNFCCC Decision 31/CMP.1, Annex I Parties are invited to report on how they are striving to implement their commitment while minimizing adverse social, environmental and economic impacts on developing country parties.

Actions taken in the framework of the Kyoto Protocol commitments are intended to contribute to preventing dangerous anthropogenic interference with the climate system. Adverse impacts of potential climate change on developing countries are thus globally reduced when Annex I countries (and Belgium among them) take measures aiming to reduce GHG emissions through energy savings and the promotion of renewable energy sources. Furthermore, most of those actions contribute to reduce air pollution related to fossil fuel uses for the benefit of all countries.

Most actions taken by Belgium in order to respect its commitments try to present no direct or indirect adverse effects for developing countries. Belgian policies and measures address not only fossil fuel combustion but also emissions of all gases covered by the Kyoto Protocol, such as methane and nitrogen protoxide from agriculture and waste management or F-gases in refrigeration systems, thus ensuring a balanced distribution of efforts and limiting the potential impact of single measures that are too specific.

Belgium is a Member State of the European Union and, as such, designs and implements most of its policies in the framework of EC directives, regulations, decisions and recommendations. For instance, Belgium has implemented the European liberalisation of electricity and natural gas markets and is involved in the European Emissions Trading Scheme, all actions aiming to address market imperfections and to better reflect externalities in energy/CO_2 prices.

Belgium has suppressed subsidies supporting the use of coal and other fossil fuels for energy production. It also applies strict rules in accordance with EC recommendations for State aid to environmental and energy saving measures, in order to maintain an undistorted free competitive market across Europe. It has never taken any action nor expressed any recommendation in favour of one energy carrier over others and has always been very careful to collaborateequally with all actors of the energy production and distribution sectors.

The Belgian agricultural policies and the promotion of biofuels are developed within the European common policies. The new EC common agriculture policy now tends to support quality products and environmental respect instead of large volumes of production, and should create market conditions more accessible to products from developing countries. Concerning biofuels, acknowledging that their development could create pressures on food prices and on land and forest management, especially in developing countries, the EC has established strict sustainability criteria which in particular include not supporting biofuels from land with high biodiversity value (primary forest and wooded land, protected areas or highly bio-diverse grasslands), or from land converted from wetlands, peatlands or continuously forested areas. It will also be very cautious about any broader environmental and social aspects such as air, water and soil quality and labour conditions.

Belgium also takes advantage of flexibility mechanisms, particularly in its participation in clean development mechanisms (CDM) projects. Actions in that domain include direct funding of projects or participation in carbon credit funds. The selection of CDM projects applies sustainability criteria based on the internationally recognized so-called "Gold Standards" checklist, addressing environmental aspects (including bio-diversity), social sustainability and development, quality of life and labour, and techno-economic aspects including employment and technological autonomy. ■

5. Projections and the total effect of policies and measures, and supplementarity relating to Kyoto Protocol mechanisms

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5.1. Projections

5.1.1. Introduction

This chapter gives the projected future trends in greenhouse gas emissions and removals, given current and projected national circumstances and the expected effect of implemented and adopted policies and measures. Projections are presented both on a sectoral and on a gas-by-gas basis. They are presented for five-year intervals from 2010 to 2020 and incorporate inventory data until 2010.

This communication presents a "with existing measures" (WEM) scenario, encompassing currently implemented and adopted policies and measures and a "with additional measures" (WAM) scenario, encompassing planned policies and measures. Furthermore it reports on sensitivity analyses for the "with existing measures" scenario.

The national projections reported in this chapter are the sum of bottom-up projections developed by the three regions (Flanders, Wallonia, Brussels-Capital) as part of their respective climate strategies. Assumptions and key parameters were harmonised among the regions. Some parameters remain different, to reflect the specificities and the activities found in each region more accurately.

The Federal Planning Bureau prepared a top-down projection at country level for the "with existing measures" scenario. This top-down projection has been used to validate the regional bottom-up projections.

5.1.2. Macro-economic context and projection parameters

5.1.2.1. International and national economic environment

Table 5.1 summarises the main assumptions regarding the international and national economic environment.

The projections presented in this report are based on a detailed bottom-up approach within each Belgian region. This approach starts from the demand side and the energy needs of the different sectors. As such, energy demand relates to an activity forecast for each sector in each region and is not necessarily consistent with the economic assumptions mentioned in table 5.1.

Assumptions on *demographic evolution* (table 5.2) are based on the prospects presented in 2011 by the FPB[33] (Plan & DGSEI, 2011) and take into account the observations of 1 January 2010. They were calculated per age, gender and district. Prospects for the number of households,

[33] In close cooperation with Belgium statistics, the Federal Planning Bureau produces long-term population projections on a regular basis. *See also Population Projections 2010-2060*, Belgian Federal Planning Office and General Direction of Statistics and Economic Information, December 2011 and http://www.plan.be/overview.php?lang=en&TM=46&IS=70

Table 5.1 Main international and national assumptions

	2000	2005	2010	2015	2020	2005-2012 average	2013-2020 average
EU12 GDP growth (% p.a.)	3.8	1.7	1.9	1.7	1.2	0.9	1.4
US GDP growth (% p.a.)	3.7	3.1	3.0	3.4	2.7	1.3	2.9
Growth rate of relevant foreign markets	12.1	6.8	11.4	4.8	4.4	4.1	4.4
Growth of non-oil commodity prices (in USD)	-10.8	-1.4	1.4	2.2	2.0	0.9	1.9
Euro in USD:							
- level x 100	92.4	124.4	132.7	125.8	125.8	134.1	125.8
- evolution (in %)	-13.4	0.1	-4.8	0.0	0.0	0.5	-0.1
Long term nominal interest rates (10 year)							
Euro area	5.4	3.4	3.3	3.7	4.0	3.8	3.8
Euro area inflation	2.1	2.1	1.6	1.9	1.9	2.0	1.9

an important variable for the energy use of households, are not included in the Demographic Prospects 2010 - 2060. These data were submitted by the regions.

Assumptions on the *evolution of fuel* prices are presented in table 5.3. They are based on assumptions regarding the evolution of fuel prices used for the development of the EU 2012 Reference scenario.

CO_2 prices are especially relevant for the choice of fuels in the electricity sector and industrial installations covered by the EU-ETS. A CO_2 price of EUR_{2010} 10 for the year 2015 with a gradual increase to EUR_{2010} 17 for 2020 in the WM scenario was suggested by the EC (table 5.4).

For the bottom-up models the evolution of fuel and CO_2 prices was not explicitly taken into account because the bottom-up applied approaches were not suited to using energy and CO_2 prices directly in their calculation methods.

Table 5.2 Demographic assumptions

Demographic assumptions	Statistics	Prospects	
	2010	2015	2020
Population Belgium	10 839 921	11 419 014	11 888 374
Number of households Belgium (mio)	4 621	5 065	5 365
Average household size Belgium	2.33	2.26	2.22

Table 5.3 Energy price assumptions

	Fuel import prices (in EUR 2010/boe)	
	2015	2020
Oil	86.0	88.5
Gas	53.8	61.5
Coal	22.0	22.6

Table 5.4 CO_2 prices

	Carbon price (in EUR2010/tCO_2)	
	2015	2020
EU ETS carbon price	10	17

5.1.2.2. CO_2 emission factors

The emission factors reported in the "Belgium's Greenhouse Gas Inventory (1990-2011) National Inventory Report" are used for the calculation of the emission projections (table 5.5). These emission factors remain constant over the projection period. Differences across regions reflect different industrial structures and technologies.

Table 5.5 Emission factors used for the energy related CO_2 emission projections

(ktonnes CO_2/PJ)	Flanders / Wallonia / Brussels
Hard coal	92.7
Cokes	106.0
Brown coal, lignite	99.2
Other solids (wastes,...)	variable
Natural gas	55.8
Cokes oven gas	38.0-40.0
Blast furnace gas	258.0 (Flanders) 256.8-264.3 (Wallonia)
Refinery gas	55.1-56.5
Heavy fuel oil	76.6
Petroleum cokes	99.8
Light fuel oil, gas oil	73.3
Gasoline	68.6
LPG	62.4
Other fuels	72.6

5.1.2.3. Global Warming Potential

CO_2 equivalent emission projections are calculated using the Global Warming Potential (GWP) values specified in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.

5.1.2.4. Climate assumptions

Climate conditions have a strong influence on energy use by households and in the services and agricultural (particularly for greenhouses) sectors. Indeed, in Belgium, a large share (about 85%) of energy use in households and services sector goes to the heating of buildings, while in the agricultural sector, about 60% of energy consumption is for the heating of greenhouses.

A key parameter in energy projections for these sectors is therefore the number of heating degree days (HDD).[34] The regional bottom-up projections for the residential and tertiary sector are calculated assuming that the number of degree-days for the period 2010-2020 is equivalent to the average degree-days of the 2002-2011 period. This average is equal to 1819 degree-days (reference 15/15) and characterizes a mild climate. The information concerning the reference year (2010) is based on the real number of degree-days (2308).

Emission data for the historic years refer to the actually reported number of degree-days.[35]

5.1.3. Scenario description

The "with existing measures" scenario indicates the likely evolution of greenhouse gas emissions in Belgium with current policies and measures. This scenario includes all policies and measures adopted at the end of 2012 by the federal and regional governments to reduce greenhouse gas emissions. Details of these PAMs are discussed in chapter 4 of this National Communication.

5.1.3.1. The energy sector

The energy industries represented 18% of the Belgian greenhouse gas emissions in 2011. Assumptions regarding net electricity import, energy and CO_2-prices (see

[34] HDD are defined relative to a base temperature - the outside temperature above which a building needs no heating, 15° in these projections. The HDD are calculated by subtracting the average temperature on any given day from the base temperature. If the value is less than or equal to zero, that day has zero HDD. But if the value is positive, that number represents the number of HDD on that day.

[35] These were 1722 for 1990; 1922 for 1995; 1714 for 2000; 1828 for 2005 and 2308 for 2010.

Table 5.6 Electricity demand and supply for Belgium

[TWh]	2010	2015	2020
Demand Wallonia	26.4	27.4	28.1
Demand Brussels region	5.8	6.2	6.7
Demand Flanders	59.2	59.5	61.3
Demand Belgium*	91.4	93.1	96.1
	0.0	0.0	0.0
Net import (balance export – import)	4.0	4.0	1.6
Production	87.4	89.1	94.5
Use for pumping and distribution losses	4.0	4.1	4.0

* Total demand (demand + use for pumping + distribution losses) = total supply (net import + production)

tables 5.3 and 5.4), and on the evolution of the electricity production park (see table 5.6) determine to a large extent the evolution of emissions over the projection period.

The 2013 emission projections for the electricity production sector are modelled at national level.

The 2013 projections for electricity production take into account:

- assumptions (calculations) on the evolution of the electricity demand (in the different sectors);
- assumptions on the evolution of the electricity production park;
- assumptions on the import of electricity

Table 5.7 Structure of electricity production (share of different fuels)

Shares in total domestic electricity production (%)	2010	2015	2020
Share of oil	0.4	0.3	0.3
Share of gas	5.1	0.5	0.4
Share of coal	34.7	36.2	36.8
Share of renewable, including biomass	6.3	17.6	27.4
Share of nuclear	52.1	43.9	33.5
Share of waste (non renewable fraction)	1.4	1.6	1.5

Table 5.8 The share of CHP in the total domestic electricity production.

Share in total domestic electricity production (%)	2010	2015	2020
Share of CHP (including CCGT with heat production)	16.5	16.9	18.1

Table 5.6 shows the demand and supply data on the electricity sector for Belgium (TWh).

Demand data below do not include own use of electricity production plants and distribution losses and represent net data. Own use is considered indirectly through reduced net efficiencies of electricity plants in model calculations.

The assumptions above show an annual increase of the electricity demand of 5.1% between 2010 and 2020. Trans-boundary electricity trading is considered exogenous in the modelling of the electricity production. The import levels in the Belgian projections up to 2020 are comparable to the draft EU reference and baseline scenario (February 2013, EC). The actual evolution of the net-import will mainly depend on new trans-boundary transport capacities, commercial opportunities and the location of new production plants.

Unlike projections for the other sectors, the projections for the supply side of the power sector were modelled at national level.

The with measures scenario integrates the decommissioning of nuclear power plants once they turn 40 years old, in conformity with the Belgian Law on the progressive phase-out of nuclear energy for industrial electricity production which wasconsented by the Federal Government on 31 January 2003. In this scenario, the decommissioned nuclear plants are mostly replaced by new CCGT-power plants. Table 5.7 shows the shares of nuclear, fossil fuel and renewables in total domestic electricity production. A large part of the base demand (base load) is met by nuclear plants, CHP installations and renewable energy (wind and biomass). Table 5.8 shows the share of CHP in total domestic electricity production.

The share of renewables in the total domestic electricity production runs up to 6.3% in 2010 and 27.4% in 2020. This share of 6.3% in 2010 meets the indicative target of 6% in 2010 set by the European Directive 2001/77/EC. The policy and measures to support and promote renewable energy in the three regions are described in the chapter 4 of this report.

The share of gas in the total domestic electricity production runs up from 34.7% in 2010 to 36.8% in 2020, while the share of nuclear declines from 52.1% to 33.5%. This increase of the share of gas is the result of an increase in electricity demand and the partial closure of the first nuclear plants. The production of the closed nuclear plants is mainly replaced by combined cycle gas turbines and renewable energy sources.

5.1.3.2. Industry

Industrial emissions (energy and process related) accounted for 29% of total Belgian greenhouse gas emissions in 2011. Projections of energy use in the industry sector are based on assumptions of activities and sometimes also the energy intensity (amount of energy used per unit of activity). These assumptions differ between the regions and reflect the differences in industrial activities.

In Flanders, for **companies participating in the new Flemish energy covenant** energy consumption and CO_2 emissions have been modelled taking into account the expected energy efficiency improvement of the covenant. For the other companies (not participating in the energy covenant) energy consumption and CO_2 emissions have been calculated assuming the impact of the recently adopted Directive 2012/27/EU on energy efficiency. For the other companies, not participating in energy covenants, energy consumption and CO_2 emissions have been calculated assuming the impact of article 7 of the recently adopted Directive 2012/27/EU on energy efficiency.

Following assumptions on activity are taken into account:

Table 5.9 Activity assumptions for the industrial sector in Flanders

Sector	2010	2015	2020
1A1b. Petroleum Refining	100	100	100
1A1c. Manufacture of Solid Fuels and Other Energy Industries	100	100	101
1A2a. Iron and Steel	100	100	101
1A2b. Non-Ferrous Metals	100	105	116
1A2c. Chemicals	100	105	116
1A2d. Pulp, Paper and Print	100	105	116
1A2e. Food Processing, Beverages and Tobacco	100	105	116
1A2f. Other	100	102	111

Table 5.10 Activity and energy intensity assumptions for the industrial sector in Wallonia

Sector	2010 - 2015		2015 - 2020
	annual growth rate of activity (%)	annual energy efficiency improvement (%)	annual growth rate of activity (%)
Iron production	0%	0.5%	0%
O2 steel production	-100%	0.5%	0%
Electric steel prod.	0%	0.5%	0%
Steel transformation	0%	0.5%	0%
Steel foundries	0%	0.5%	0.0%
Non ferrous metals	0%	0.5%	0%
Cement	2.8%	0.5%	0%
Lime	5.1%	0.5%	0.0%
Flat glass	4.3%	0.5%	1.6%
Container glass	4.6%	0.5%	0%
Glass fibres	1.3%	0.5%	1.4%
Other non metallic minerals	0.0%	0.5%	0.9%
Paper pulp	0.0%	0.5%	0.0%
Paper	-0.5%	0.5%	-0.5%
Basic chemistry (*)	1.8%	0.5%	1.5%
Chemical specialities (**)	11.8%	0.5%	0.0%
Food and drinks (***)	1.9%	0.5%	1.5%
Metal processing	1.9%	0.5%	2.0%
Textiles	2.0%	0.5%	2.0%
Other industries	2.0%	0.5%	2.0%

(*): order of magnitude
(**): Ammonia
(***): except sugar and milk

In Wallonia, basic assumptions taken to establish emissions projections are presented in table 5.10. It lists for each major industrial sector the assumed activity growth rates between 2010 and 2015 and between 2015 and 2020. It also provides annual energy efficiency improvements and calculates global energy changes between 2010 and 2015.

Large energy consumers are modelled at installation level. This includes major iron and steel installations, clinker and lime kilns and flat glass ovens. Between 2010 and 2015, rates of change of activities are based on estimates of market growths or perspectives of industrial sectors, investment projects and equipment closures that are announced. Resulting rates are listed in the preceding table. After 2015, large installations are assumed to be maintained in activity. Expected structural changes are taken into account when known.

All major industries are involved in industry-wide agreements whereby they are committed to improve their energy/CO_2 efficiency by 2010/2012. Industry-wide agreements are implemented until 2012. New agreements for the period 2012-2020 are still under negotiation and not yet signed. Therefore they are not considered in the WEM scenario.

In both regions, projections of process emissions are mainly linked to growth rates of activity and implementation of reduction measures in some sectors, such as those that were implemented in 2011 in Wallonia for the chemistry sector, resulting in a sharp drop in N_2O emissions. Comparable measures were implemented previously in Flanders in the chemical sector.

The F-gas emission projections are drawn up from the model developed by ECONOTEC Consultants and VITO in the context of a study commissioned by the Federal Department of the Environment[36] in 2012.

Table 5.11 below gives the percentage of the total emissions covered by the EU ETS.

5.1.3.3. The buildings sector

In 2011 the building sector accounted for nearly 19% of the total Belgian greenhouse gas emissions.

The number of households and climate assumptions, along with implemented policies and measures, are the main drivers for projected emissions in the residential sector. As outlined in chapter 4, policies and measures differ for new and existing dwellings. The climate regulations and measures considered for the projections, such as the EC directive on energy performance of buildings and use of renewable energy (solar boilers and heat pumps) are presented in chapter 4, 'Policies & Measures'. The assumed evolution of the population and

[36] ECONOTEC Consultants and VITO 2004, Preparation of a federal policy for the reduction of greenhouse gas emissions (HFCs, PFCs and SF_6).

Table 5.11 EU ETS split: percentage of the emissions covered by the EU ETS (in accordance with ETS scope 2013-2020)

	2010	2015	2020
Total (excluding LULUCF and all aviation emissions)	40%	37%	37%
Energy - Energy Industries (1A1)	90%	85%	86%
Manufacturing Industries and Construction (1A2)	83%	82%	79%
Industrial Processes (2)	75%	71%	66%
1A4, 1A5, 1B	1%	1%	1%

Table 5.12 Livestock numbers used in the projections

Animal numbers (thousands)	2010	2015	2020
Dairy Cattle	462	581	549
Non-dairy Cattle	2 165	1 989	2 043
Sheep	105	100	96
Swine	6 626	6 806	6 786
Poultry	32 577	33 592	33 363
Others (horses, goats)	92	95	102

number of households is presented above (table 5.2). Distinction is made between new and existing houses regarding energy performance.

The share of natural gas in the total energyconsumption of the residential sector rises at the expense of heating oil.

In the tertiary sector, projections are based on the expected evolution of activity of the different subsectors and the implementation of energy saving measures in each of the regions.

5.1.3.4. The agricultural sector

The share of agricultural emissions, including combustion emissions, amounted to 9.6% of total Belgian greenhouse gas emissions in 2011.

Greenhouse gas emissions in the agricultural sector mainly consist of CH_4 and N_2O emissions originating from animal husbandry and emissions from agricultural soils.

The livestock numbers mentioned in table 5.12 were used in the 2013 projections and are the main drivers of the projected trends.

5.1.3.5. The transport sector

Transport emissions accounted for 22.5% of Belgium's greenhouse gas emissions in 2011. Projections are based on a bottom-up approach taking into account the expected number of kilometres travelled by different transport modes and on assumptions regarding the distribution of vehicles. The evolution in travelled kilometres is based on historical trends and on assumptions about the effect of policies regarding modal shift. The projections integrate the policies and measures outlined in chapter 4. The main driver in this sector is the expected increase in road transport. In Flanders, passenger car transport stabilises between 2010 and 2020 but the road freight transport is expected to increase by 11% in 2020 over 2010. In Wallonia, growth is estimated at 1.8% per year until 2020 for freight transport, while the growth of mobility for passenger cars is 0.9% until 2020. In the Brussels Capital Region, road transport emissions are expected to increase by 0.55% per year until 2016; once the implementation of the RER (regional express network improving public transportation) starts, the tendency is reversed and an annual average decrease of 0.22% is expected.

5.1.3.6. The waste sector

This sector accounted for 1.3% of total greenhouse gas emissions in Belgium in 2011 (mainly SWDS and wastewater treatment plants). Chapter 4 describes the policies and measures implemented to reduce these emissions further.

5.1.3.7. Land use change and forestry

Land use change and forestry is a net carbon sink in Belgium. Forests are a major sink of carbon and is rather stable over time while other sectors are sources (with the exception of grassland and wetlands in recent years). The average annual CO_2 absorption is approximately -1000 Gg CO_2 eq. (-1268 Gg CO_2 eq. in 2011). No specific projections are available for this sector except for forest management, where a business as usual scenario in order to draw up the Forest management reference level, which was submitted to the UNFCCC in 2011. Those projections were calculated by the Joint Research Centre of the European Commission (JRC) in close collaboration with the relevant Belgian administrations, taking into account inter alia the historical removals or emissions from forest management, age class structure of the forest, policies and measures implemented before mid-2009 and forest management activities.

5.1.3.8. The international bunker fuels

Emissions from international aviation have increased by 38% since 1990, while emissions from maritime transport have risen by 90% (with a dip after 2009 due to economic crisis and a revival since 2011). The emissions are calculated on the basis of sold fuel quantities. The projections reported are those calculated by the HERMES model.

5.1.4. Models used

This section describes the three models used for the projections. Regional projections were prepared using the Flemish energy and greenhouse gas simulation model (Flemish region) and EPM (Walloon and Brussels Regions). The Federal Planning Bureau used HERMES to prepare a projection at country level.

5.1.4.1. Flemish energy and greenhouse gas simulation model

A new Flemish energy and greenhouse gas simulation model was developed in 2011 to build short term projections to be used in the Flemish Climate Policy Plan 2013-2020. The simulation model is a projection model for energy demand and greenhouse gas emissions that covers most of the relevant emission sectors (energy sector, industry, residential and commercial buildings).

This simulation model follows a "bottom-up" approach, i.e. it quantifies energy consumption and GHG emissions based upon activity variables (expressed as far as possible in physical units) and considers the other main determining factors of energy demand.

5.1.4.2. EPM

EPM (Energy/Emissions Projection Model) is a projection model for energy demand and atmospheric emissions that covers all relevant emission sectors (energy sector, industry, residential, commercial, transport). It has been developed progressively by ECONOTEC since 1993 in the framework of a number of studies carried out for public authorities, at both the regional and national level.

Given the heterogeneity of sectors such as the iron & steel industry, the chemical sector or the residential sector, calculations must take into account internal structural effects, i.e. the difference in evolution of sub-sectors when these sub-sectors have different levels of specific consumptions or emissions.

EPM is a simulation model, of the "bottom-up" type, i.e. explaining energy consumption and GHG emissions through activity variables expressed as far as possible in physical units with a detailed representation of emission sources and the main factors determining the evolution of energy demand and the various types of emissions.

This methodological option is based on the observation that there is no simple and homogeneous relationship between aggregated macroeconomic variables expressed in monetary value and actual energy consumption.

5.1.4.3. Environment Brussels Energy Emissions Projections Model

The Brussels Institute for Environmental Management (IBGE/BIM) has developed its own projection model for energy demand and atmospheric emissions from stationary sources (residential, tertiary, industry and energy sector).

As bottom-up type model, changes in consumption of the several energy carriers used in the Brussels-Capital Region (natural gas, light oil, propane/butane, coal, electricity, wood, solar and heat pump) and their associated emissions (CO_2, CH_4, N_2O, NO_x, CO, NMVOC, SO_x, NH_3, PM) are determined by the evolution of parameters that define the consumption of each sector.

For example, the residential sector is defined by the following main parameters:

- population and average household size (these 2 parameters define the net requirement for new dwellings)
- climate (expressed in degree-days, this parameter is of great importance for the Brussels-Capital Region, as it reflects the need for building heating which accounts for 70% of regional GHG direct emissions)
- renovation rate, improvement of energy efficiency expected in case of renovation. This improvement depends on the typology of building stock composed of 244 type-dwellings: apartment or house, 4 age ranges for the building concerned, the 7 energy carriers used for heating, the heating system installed (central or decentralised), and wether it is occupied by the owner or tenant

The model also takes into account the GHG direct emissions that are not related to energy consumption: i.e. the fugitive methane emissions of natural gas delivery, the use of N_2O for anaesthesia, emissions from the decomposition of organic matter (composting plant, water purification plant).

5.1.4.4. HERMES

HERMES is the macrosectoral model used by the Belgian Federal Planning Bureau for its national short and medium term forecasts. The model is also used for variant analysis. The simulation period varies from 1 to 12 years, depending on the exercise. HERMES fits in the tradition of annual econometric models based on time series analysis. Since disaggregation is a key feature of the model, it is possible to describe shifts among the different sectors or branches; it also makes it possible to highlight the various effects of measures or external shocks on separate branches.

HERMES is a medium-term demand-oriented model in which supply elements play an important role. The activity of the branches is determined mainly through the demand side. Production capacity is also demand-determined in the long run, although supply effects are present. Contrary to technological models, HERMES does not explicitly integrate a description of the different production technologies. Adjustment of production to existing capacity plays a role in the explanation of prices, investments and imports. HERMES incorporates fundamental neoclassical mechanisms to determine the marginal technical coefficients, and explain investment and compute capacities. Supply side effects are also incorporated in export equations. Technological progress is exogenously included in the production functions.

Starting from internal and external demand, the model computes the marginal profitability of production capacity. For this purpose, it calculates the optimal allocation of the sectors' resources between the different production factors (capital, labour, energy and other intermediary inputs) on the basis of anticipated factor prices. Production costs constitute the main determinant of prices in HERMES. Other determinants in the short run are capacity utilization rates in each sector. Once demand on the various markets and prices have been computed the model allocates total resources between the different agents and computes their disposable income, taking into account taxes and social contributions paid to the State and social transfers received by each of them.

5.1.5. Projections and total effect of policies and measures in the "with existing measures" scenario

The projections are first presented for each greenhouse gas covered by the Kyoto Protocol. Then, total greenhouse gas emissions, including aggregated information for each sector are presented.

5.1.5.1. CO_2 emission projections

CO_2 is the main greenhouse gas in Belgium. Greenhouse gas emissions in the "with existing measures" scenario, including all climate policy measures approved so far, are expected to decrease up to 2020.

Table 5.13 CO_2- emission projections for Belgium

CRF format (ktonnes CO_2-eq)	1990	2000	2010	2015	2020
1 Energy	110 387	115 416	106 711	97 148	96 131
1A Fuel combustion	110 302	115 250	106 608	97 045	96 027
1A1 Energy industries	29 789	28 301	26 246	21 570	22 283
1A2 Manufacturing industries and construction	32 605	33 148	23 389	22 337	22 366
1A3 Transport	20 427	24 453	26 857	27 076	26 694
1A4 Commercial / residential / agriculture	27 320	29 256	30 068	26 014	24 637
1A5 Other	161	93	47	47	47
1B Fugitive emissions from fuels	84	165	103	103	103
2 Industrial processes	8 417	9 662	7 471	8 209	8 390
3 Solvent and other Product Use	NA	NA	NA	0	0
4 Agriculture	0	0	0	0	0
5 Land-Use Change and Forestry	-927	-730	-1 451	-2 556	-2 113
6 Waste	290	172	691	720	786
7 Other	0	0	0	0	0
Total excluding LULUCF	119 094	125 250	114 873	106 078	105 306

Table 5.14 CH_4 – emission projections for Belgium

CRF format (ktonnes CO_2-eq)	1990	2000	2010	2015	2020
1 Energy	1 335	805	768	703	680
1A Fuel combustion	477	339	322	250	239
1A1 Energy industries	18	14	41	36	36
1A2 Manufacturing industries and construction	83	76	67	36	36
1A3 Transport	128	66	20	12	9
1A4 Commercial / residential / agriculture	249	182	194	166	158
1A5 Other	0	0	0	0	0
1B Fugitive emissions from fuels	858	466	446	453	441
2 Industrial processes	0	4	20	20	21
3 Solvent and other Product Use	0	0	0	0	0
4 Agriculture	5 547	5 336	4 941	5 066	4 959
5 Land-Use Change and Forestry	0	0.002	0	0	0
6 Waste	2 826	2 145	780	547	402
7 Other	5 547	5 336	0	0	0
Total excluding LULUCF	15 255	13 626	6 508	6 336	6 062

Table 5.15 N_2O-emission projections for Belgium

CRF format (ktonnes CO_2-eq)	1990	2000	2010	2015	2020
1 Energy	654	773	676	586	567
1A Fuel combustion	654	773	676	586	567
1A1 Energy industries	184	214	148	113	114
1A2 Manufacturing industries and construction	105	107	170	82	29
1A3 Transport	261	349	252	282	308
1A4 Commercial / residential / agriculture	103	103	106	108	116
1A5 Other	2	1	1	0	0
1B Fugitive emissions from fuels	IE,NA,NO	IE,NA,NO	IE,NA,NO	0	0
2 Industrial processes	3 943	4 576	2 596	1 499	1 502
3 Solvent and other Product Use	213	214	211	214	214
4 Agriculture	5 770	5 193	4 487	4 645	4 614
5 Land-Use Change and Forestry	13	48	94	0	0
6 Waste	296	281	298	303	307
7 Other	5 770	5 193	0	0	0
Total excluding LULUCF	16 646	16 229	8 268	7 246	7 204

5.1.5.2. CH_4 emission projections

CH_4 accounted for nearly 8% to the 1990 greenhouse gas emissions in Belgium. Its share is expected to decrease by 2020. The largest reductions since 1990 took place in the agriculture, waste and natural gas distribution sectors. CH_4 emissions are expected to decrease further due to further reductions in the fugitive emissions (gas distribution), agriculture and waste sectors.

5.1.5.3. N_2O emission projections

N_2O contributed for a little over 7% to the 1990 greenhouse gas emissions in Belgium. Reductions since 1990 have been attained in industrial processes (ni-

Table 5.16 F-gas emission projections for Belgium

	CRF format (ktonnes CO_2-eq)	1990	2000	2010	2015	2020
2 E 1	1. By-product Emissions - Other	2 775.0	6.5	7.7	6.7	6.7
2 E 2	2. Fugitive Emissions	537.7	354.4	69.4	131.7	131.7
2 F 1	Refrigeration and Air Conditioning Equipment		626.1	1 755.9	1 889.3	1 632.7
2 F 2	Foam Blowing		248.5	102.2	88.2	92.8
2 F 3	Fire Extinguishers		4.4	12.4	11.4	8.6
2 F 4	Aerosols/ Metered Dose Inhalers		64.4	69.5	70.1	72.4
2 F 5			0.0	0.0	0.0	0.0
2 F 6			0.0	0.0	0.0	0.0
2 F 7	Semiconductor Manufacture		0.0	10.1	8.1	8.1
2 F 8	Electrical Equipment	19.5	19.5	13.4	10.9	10.6
2 F 9	Other	83.6	92.0	90.3	93.4	88.8
	Total	3 416	1 416	2 131	2 310	2 052

tric acid and caprolactam) and in agriculture. N_2O emissions decreased further in the period 2010-2012, mainly because of process improvement in nitric acid production.

5.1.5.4. F-gas emission projections

Emissions of fluorinated gases (F-gasses) decreased rapidly in the late 90s due to a swift reduction in emissions in the chemical sector. It is expected however that F-gas emissions will increase again by 2020 mainly because of increased refrigeration and other applications.

5.1.5.5. Aggregated projections

The total greenhouse gas emissions in the 'with existing measures' scenario decreases from **131.6 Mtonnes CO_2-eq** in 2010 to **122.0 Mtonnes CO_2-eq** in 2015 and to **120.6 Mtonnes CO_2-eq** in 2020. These projections do not include emissions nor removals from LULUCF.

5.1.6. Comparison with macro-economic top down approach

The national projections as described above are the sum of regional projections based on bottom-up approaches without direct link to the macro-economic context. In order to validate this bottom-up approach these compiled regional projections have

Table 5.17 Greenhouse gas emission projections for Belgium in the 'with existing measures' scenario

CRF format (ktonnes CO_2-eq)	2010	2015	2020
1 Energy	107 776	98 437	97 378
1A Fuel combustion	107 229	97 881	96 834
1A1 Energy industries (including CHP)	26 311	21 720	22 433
1A2 Manufacturing industries and construction	23 600	22 456	22 432
1A3 Transport	27 099	27 370	27 011
1A4 Commercial / residential / agriculture	30 170	26 287	24 911
1A5 Other	48	48	48
1B Fugitive emissions from fuels	547	556	544
2 Industrial processes	12 231	12 038	11 965
3 Solvent and other Product Use	214	214	214
4 Agriculture	9 568	9 711	9 573
5 Land-Use Change and Forestry	-2 780	-2 556	-2 113
6 Wastes	1 768	1 570	1 495
7 Other	0	0	0
Total excluding LULUCF	131 557	121 970	120 625

Table 5.18 GHG emissions projections based on a macrosectoral approach

	2005[a]	2010[a]	2015[b]	2020[b]
1. Energy	116 221	110 274	98 128	100 351
1A. Fuel Combustion	115 690	109 726	97 641	99 870
1A1. Energy Industries	28 778	25 747	25 788	26 173
1A2. Industry	31 090	23 766	18 119	20 290
1A3. Transport	26 187	25 498	24 044	24 196
1A4. Other sectors	29 542	34 655	29 631	29 150
1A5. Other	93	60	60	60
1B. Fugitive emissions	530	548	487	482
2. Industrial processes	15 721	13 467	14 190	15 716
3. Solvent and other product use	0.215	0.214	0.214	0.214
4. Agriculture	9 984	10 042	10 098	10 154
6. Waste	1 575	1 165	909	745
Total GHG emissions	143 715	135 161	123 539	127 180
ETS (scope 2013-2020)	66 447	54 693	49 764	53 043
International bunkers	28 516	25 203	27 662	32 497

[a] National GHG Emission Inventory of October 2012, CO_2-emissions from fuel combustion are calculated endogenously by HERMES

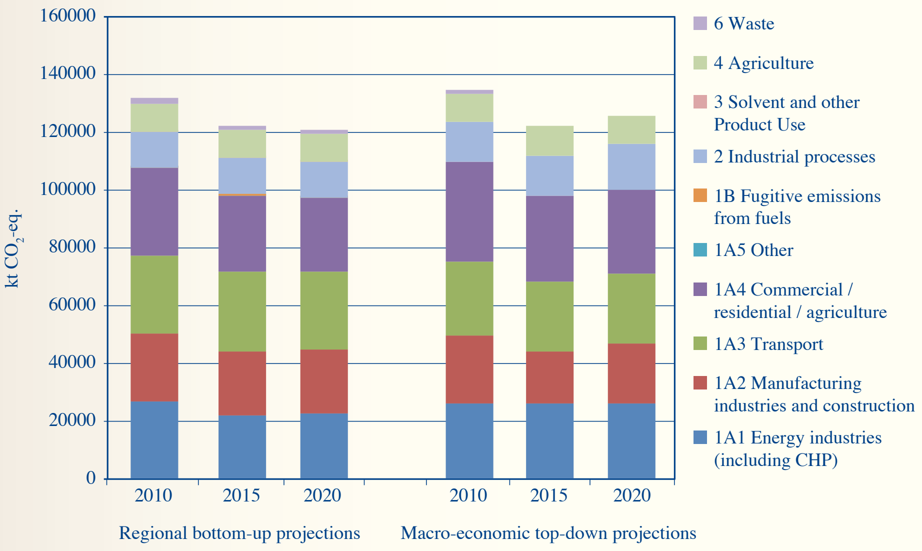
[b] HERMES calculations

been compared with national projections developed by the Federal Planning Bureau based on a macrosectoral top-down econometric model (HERMES). This national modelled projection is more closely linked to macroeconomic assumptions.

Although the top-down projections differ from the bottom-up projections in the way emissions are allocated, both projections show some similar tendencies for the energy industries/transformation sector and industrial processes, with a significant increase of emissions.

The difference between the two projections boils down to different expectations regarding the evolution for the 2015 – 2020 period. This difference is due to the way the models used respond to them. Macro-economic models such as HERMES are more sensitive to price variations than technical-economic models.

Figure 5.1 Comparison of regional bottom-up and macro-economic top down projections, excluding LULUCF (ktonnes CO_2-eq)



Both the top-down HERMES projections and the average bottom-up projections expect a significant decrease of total emissions between 2010 and 2015, with a difference between the models of less than 1.4% of the emissions. However, after this period, HERMES indicates a steep decrease of the emissions in manufacturing industries in 2015 followed by an increase in 2020, an increase in industrial processes and rather stable emissions in electricity production, while the bottom-up approach indicates only a moderate decrease in manufacturing industries up to 2020, a decrease in industrial processes and a steep decrease in electricity generation.

The resulting overall trend is very different between the two models, whether increasing or decreasing after 2015, with a difference in 2020 representing 5.3% of the 2010 GHG emissions.

5.1.7. Sensitivity analysis of the 'with existing measures' greenhouse gas emission projections

Sensitivity analyses are performed for some important parameters such as number of degree-days, nuclear phase out, without however taking indirect effects into account.

5.1.7.1. Number of degree-days

Climate plays an important role in energy consumption for the residential and tertiary sector. The "with existing measures" scenario is based on a mild climate that has been established considering the number of degree-days. For this report, it is equivalent to the average values for the period 2002-2011, namely 1819 degree-days. To identify the impact on the energy consumption of a colder and warmer weather, the sensitivity analysis is made for two scenarios:

Table 5.19 Sensitivity analysis: degree-days

CO_2 projections 2020 (ktonnes)	1819 degree-days	1538 degree-days	1946 degree-days
Tertiary sector	5 272	4 978	5 398
Residential sector	16 883	15 434	17 503
Total	22 155	20 412	22 901

Table 5.20 Greenhouse gas emission projections for Belgium in the 'with additional measures' scenario

CRF format (ktonnes CO_2-eq)	2010	2015	2020
1 Energy	107 776	97 115	95 513
1A Fuel combustion	107 229	96 559	94 969
1A1 Energy industries (including CHP)	26 311	21 720	22 433
1A2 Manufacturing industries and construction (without CHP)	23 600	21 207	20 724
1A3 Transport	27 099	27 370	27 011
1A4 Commercial / residential / agriculture	30 170	26 215	24 754
1A5 Other	48	48	48
1B Fugitive emissions from fuels	547	556	544
2 Industrial processes	12 231	12 038	11 965
3 Solvent and other Product Use	214	214	214
4 Agriculture	9 568	9 711	9 573
5 Land-Use Change and Forestry	0	0	0
6 Wastes	1 768	1 570	1 495
7 Other	0	0	0
Total excluding LULUCF	131 557	120 648	118 760

– Cold climate: 1946 degrees-days (Average of 1985-2009).
– Warm climate: 1538 degree-day (2011)

In case the future climate is milder (1538 degree days, as observed in 2011), CO_2 emissions from the buildings sector would be 1743 kt CO_2 lower in 2020. In case of colder climate (1946 degree-days, average of the past 25 years, as used in the efficiency action plan) emissions would be 746 kt CO_2 higher. These values represent respectively 2.5% and 1.1% of the Annual Emission Allocation for 2020. Hence, climate will have a significant impact on the future commitments for the non ETS sector.

5.1.7.2. Nuclear phase out

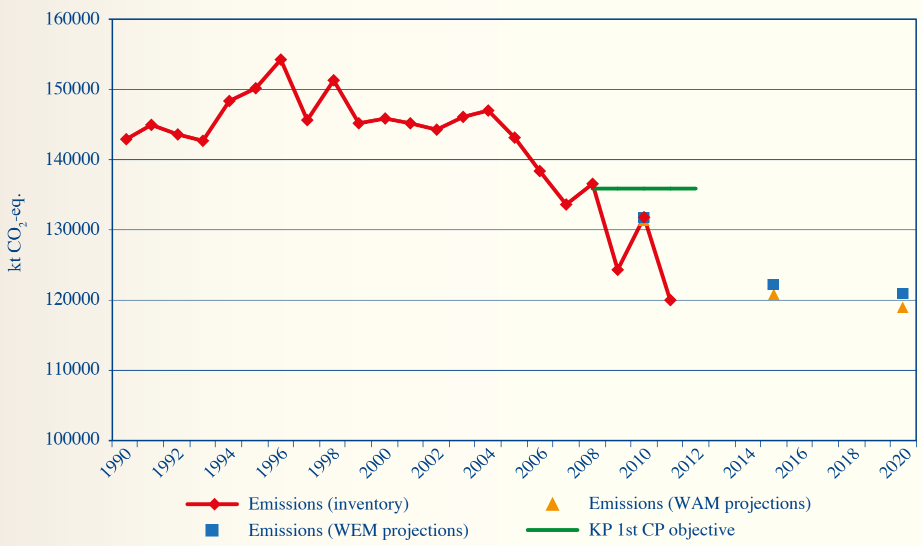
The "with existing measures" scenario integrates the Belgian Law on the progressive phase-out of nuclear energy from 2015 to 2025. On January 31, 2003, the Belgian federal parliament voted a law that promulgates the gradual phase-out of nuclear fission energy for commercial electricity production. The law prohibited the construction of new nuclear power plants and set a 40-year limit on the operational period of existing plants. However, in 2012, the Energy State Secretary and the Federal Government proposed an adapted scheme for the nuclear phase out and decided in 2012 to postpone by 10 years the shutdown of Tihange 1 from 2015 to 2025. This decision has not yet been confirmed by law. The first reactor to be shut down will be Doel 1 in February 2015 followed by Doel 2 in December 2015. The last Belgian nuclear power reactor will be shutdown in 2025 (cf. 2.5.1). In both scenarios, the nuclear power plants will be mostly replaced by new CCGT-power plants and additional renewable production capacity. The differences between both schemes by 2020 are limited. In the new proposal the Tihange 1 reactor's operation is extended until 2025, while it shutdown was initially foreseen in 2015 according to the 2003 legislation. In case nuclear phase-out will follow the 2003 law, total CO_2 emissions would be about 443 kt CO_2 higher in 2015 and 1330 kton CO_2 higher in 2020 compared to the phase-out depicted in the 2012 proposal.

5.1.8. "With additional measures" greenhouse gas emission projections

The Belgian federal and regional governments are in the process of defining measures to meet the renewable energy and non-ETS objectives for 2020 of the European Energy Climate Package. The scenario "With additional measures" scenario (table 5.20) only integrates additional measures regarding renewable energy production and measures reducing greenhouse gas emissions in the non-ETS sectors. Emissions related to fossil fuel consumption in the ETS-sector will, from 2013 onwards, be regulated by the harmonised EU ETS cap. It is important however to underline that the impact of the additional measures, as estimated here, is the result of a first analysis that needs to be supplemented with socio-economic feasibility analyses. Furthermore, as for the "with existing measures" scenario, uncertainties exist regarding these projections which have not been analysed so far.

The additional measures represent an estimated total additional reduction of about 1.9 Mtonnes CO_2-eq in 2020.

Figure 5.2 Total Belgian GHG emission projection in the WEM and WAM scenario (ktonnes CO_2 eq)



5.1.9. Conclusion

5.1.9.1. Overall emission levels

The total greenhouse gas emissions in the "with measures" scenario decreases from **131.6 Mtonnes CO_2-eq** in 2010 to **122.0 Mtonnes CO_2-eq** in 2015 and to **120.6 Mtonnes CO_2-eq** in 2020, These projections do not include emissions nor removals from LULUCF.

Projections with the macro-economic model suggest a decrease in emissions between 2010 and 2015 (**123.5 Mtonnes CO_2-eq**), but with an increase in 2020 (**127.2 Mtonnes CO_2-eq**).

Uncertainties do exist concerning exogenous variables such as economic growth, climate conditions, electricity imports and closure of the nuclear plants. Their level influences the resulting greenhouse gas emissions, notably in the sectors covered by the EU ETS.

The proposed additional measures show an additional reduction potential of 1.9 Mton in 2020, reducing the total CO_2-eq in the "with additional measures" scenario to **118.8 Mtonnes CO_2-eq.**

5.1.9.2. Comparison with the Kyoto target 2008-2012

The annual average quantity of assigned amount units for Belgium in the Kyoto period equals 134.8 million AAUs.

The emissions from the inventory years 2008-2011, together with the first indications for 2012, suggest that greenhouse gas emissions in Belgium in the Kyoto period 2008-2012 will be below the Kyoto target.

However, taking into account the internal burden-sharing in Belgium and the assigned amount units converted into quotas and allocated under the ETS, GHG emissions below the target do not necessarily mean that compliance would be ensured from a national registry point of view. This issue is analysed hereunder in section 5.3.

5.1.9.3. Comparison with the 2013-2020 Target

A greenhouse gas emission limit of -20% in 2020 compared to 1990 greenhouse gas emissions levels was set for Belgium in Decision 1/CMP8. However, this target will be subject to a burden-sharing between EU member States, under Article 4 of the Kyoto Protocol. Hence, it seems too early to comment on the projected emissions in 2020.

Within the internal EU policy,[37] the Belgian targets are -21% for the ETS sector and -15% for the non-ETS sector. Taking into account the expected effect of the adjustments pursuant to Article 10 of the Effort Sharing Decision, this results in an emission reduction objective for the non-ETS sectors in Belgium of 66.7 Mt CO_2-eq. As the current projected emissions for the non-ETS sector are 75.7 Mt CO_2-eq. existing and currently envisaged additional measures would not be sufficient to reach the non-ETS target in 2020. However, the internal Belgian burden sharing of the ESD targets has not been adopted yet, so no final conclusions can be drawn for the time being from a regional nor national point of view.

[37] Effort-Sharing Decision EC 406/2009 and other legislative acts.

5.2. Assessment of aggregated effects of policies and measures

According to the UNFCCC reporting guidelines (para 41) the total effect of policies and measures can be calculated as the difference between the "with measures" and the "without measures" scenarios, or as an aggregation of the individual effect of each significant policy and measure.

Belgium did not establish a "without measures" scenario since its climate policy is in place for many years now and it has become difficult to assess the way energy use and greenhouse gas emissions would have evolved without this policy.

Chapter 4 of this communication indicates the reduction effect of (a combination of) some existing policies and measures, for which such an effect could be estimated. Those impacts were calculated using a bottom-up approach. Although this analysis paid attention to the possible interlinkages between the different measures, double counting and overlap are still possible while the effect of several other measures could not be estimated.

Moreover, potential emission reductions represented by these measures, are estimated with respect to a reference situation which is not evaluated (the so called "scenario without measures"). The aggregated reduction effect should therefore be interpreted with care. In chapter 4, it is estimated around 19.75 Mtonnes CO_2-eq in 2015 and 27.3 Mtonnes CO_2-eq in 2020.

Those emission reduction potentials are mostly due to the implementation of existing measures that are parts or extensions of elements of the National Climate Plan (2009-2012).

Indeed, as already mentioned in chapter 4, Belgium is currently in a transitional position as several authorities are still in the process of establishing their climate policy towards 2020. Many new ideas are under discussion, but cannot yet be considered as "planned" as long as they have not been submitted to the respective Governments.

Only a few measures can be considered as contributing to the "with additional measures" scenario, as they are planned in the framework of several action plans upon which the climate policies of Regions partly rely. For instance:

– In Flanders, the schedule of introduction for progressively stricter energy performance requirements for of buildings (applicable to new constructions and thorough renovations) is defined in the 2013-2020 climate plan. It is thus an existing measure. However, stricter requirements are envisaged and can be considered as additional measures
– In Wallonia:
  - several future stages and a calendar for the progressively stricter energy performance requirements for of buildings (new constructions and thorough renovations), have not yet been officially defined;
  - the extension to 2020 of Energy/CO_2 efficiency agreements in industry, whose principle is accepted by the Regional Government, conventions with industries and their federations remain to be signed.

Among the global reduction potential of 27.3 Mtonnes CO_2-eq in 2020, only 1.87 Mtonnes CO_2-eq are as yet due to "additional measures".

5.3. Supplementarity relating to mechanisms under Article 6, 12 and 17, of the Kyoto Protocol

The EU Emissions Trading Scheme (ETS), besides being a very important policy instrument for the energy and industrial sectors, is also an important factor in determining the amount of flexibility mechanisms to be used by the federal and regional governments. The National Allocation Plan 2008 – 2012 sets the quantity of allowances allocated to sectors covered by the ETS. The allowances, EUAs which are converted AAUs, are allocated to the installations and are therefore no longer available to governments to cover the emissions outside the ETS. The average annual allocation during the Kyoto Period to the installations covered by the ETS amounts to 58.5 Mtonnes CO_2-eq, irrespective of the actual emissions by these installations during that period. This implies that the annual average quantity of allowances for Belgium in the Kyoto period (134.8 Mtonnes CO_2-eq) is translated into a target for the sectors not covered by the EU ETS. This "non-ETS"-target equals 76.3 Mtonnes CO_2-eq (134.8 Mtonnes CO_2-eq – 58.5 Mtonnes CO_2-eq).

At the national level, the average non-ETS emission level in the Kyoto first commitment period is estimated to be 78.847 Mtonnes CO_2-eq[38] per year or 2.542

[38] The total overall estimated emission level in the period 2008 – 2012 is 635.218 Mtonnes of which 240.983 Mtonnes is covered by the EU ETS (scope 08-12). The difference between the two is therefore the total emissions in the period 2008 – 2012 not covered by the ETS and these emissions amount to 394.235 Mtonnes. The average annual value is this total divided by 5.

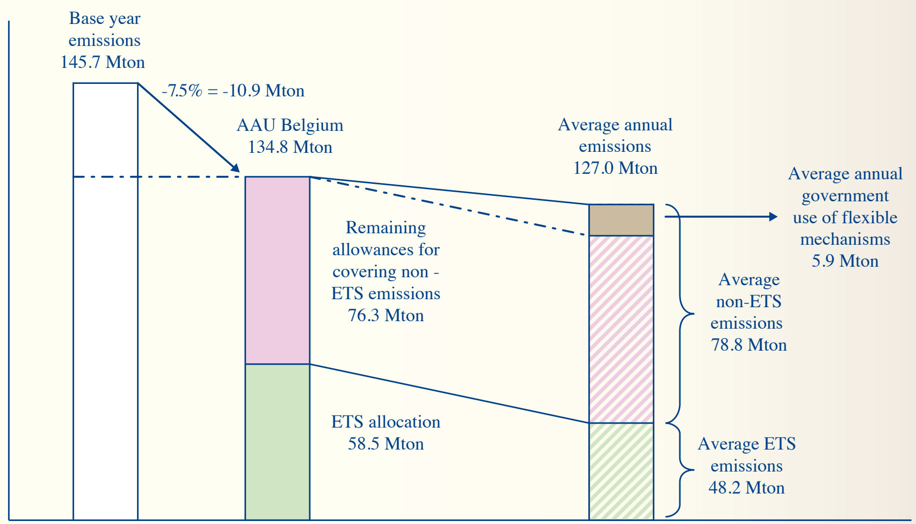
Table 5.21 Supplementarity during the first commitment period (2008 – 2012): use of flexible mechanisms

Reduction target in absolute numbers (2008 – 2012)	kt CO_2-eq	No information (No Without Measures Scenario)
Initial Assigned Amount Units (2008 – 2012) *of which allocated to ETS* *of which available for non-ETS*	kt CO_2-eq	673 995 292 472 381 523
Actual emissions (2008 – 2012, 2012 is estimated for non-ETS based on the 2011 emissions, corrected for the degree-days) *of which ETS* *of which non-ETS*	kt CO_2-eq	635 218 240 983 394 235
Difference AAUs – emissions *for ETS* *for non-ETS*	kt CO_2-eq	38 777 51 489 -12 712
Planned Government use of flexible mechanisms[39, 40]	kt CO_2-eq	29 449
Use of flexible mechanisms in EU ETS[41] *CDM* *JI*	kton CO_2-eq	19 065 13 667 5 398
Total use of flexible mechanisms		48 514
Emission reduction by flexible mechanisms (compared to target)	%	N.a.
Share of flexible mechanisms in covering the emissions *for ETS* *for non-ETS*	%	7.7% 7.9% 7.5%

[39] The planned use of flexible mechanisms at government level (to cover non-ETS emissions) reflects the impact of the national burden sharing agreement.
[40] As the purchase of Kyoto Units is still ongoing, no data per type of Kyoto unit can be provided.
[41] Source: Belgian Greenhouse Gas Registry

Mtonnes CO_2-eq above the annual target for these sectors (see figure 5.3). The total intended use of flexible mechanisms at government level is estimated at 29.5 Mtonnes CO_2-eq for the whole first commitment period of the Kyoto Protocol (see table 5.21). This amount reflects the impacts of the national burden sharing agreement. ■

Figure 5.3 Overview of internal reductions and use of flexible mechanisms to meet the Kyoto target[42]



[42] The planned use at government level of flexible mechanisms (to cover non-ETS emissions) reflects the impact of the national burden sharing agreement.

6. Vulnerability assessment, climate change impacts and adaptation measures

6.1. Introduction

6.1.1. European context

The White Paper adopted in 2009 establishes a framework aiming to reduce the vulnerability of the European Union to the effects of climate change.

The White Paper contains more than 33 actions which have already been implemented or are currently in progress, which has enabled a more coordinated approach to be developed at European level by integrating adaptation to climate change in the various sectors (including forestry, transport, biodiversity, marine environments, etc.).

Various studies have also been carried out or launched, which have enabled climate adaptation to be taken into account in the various policies.

Progress has also been made regarding the enlargement of the knowledge base with respect to adaptation through the creation of the website 'Climate-ADAPT' [65], which provides up-to-date information on climate change impacts, vulnerabilities and good practices in the field of adaptation.

Finally, the European Commission published the European adaptation strategy in April 2013. This strategy aims to contribute to making Europe more resilient.

To achieve this, the strategy focuses on 3 key aspects:

– promoting initiatives at Member State level;
– better-informed decision-making;
– taking better account of adaptation in the most vulnerable sectors ('climate proofing').

Also in 2013, the European Commission adopted a communication on green infrastructure, which clearly identifies the link with adaptation and mitigation policies.

6.1.2. National context

The growing awareness that climate change is inevitable has led to considering climate policy from two complementary viewpoints: 'adaptation' and 'mitigation'.

The expected increase in temperatures and heat waves, the variation in precipitation patterns and the rise in sea level will have environmental and socio-economic repercussions in Belgium. On the basis of the analysis of the expected impacts, the hierarchy of vulnerabilities and the search for operational solutions, adaptation measures have already been taken and will be supplemented to reduce the vulnerability of our country to the effects of climate change.

Since its 5th National Communication, Belgium has made significant progress in the field of adaptation.

In 2010, Belgium adopted its national adaptation strategy. This pursues 3 objectives:

- to improve consistency between the adaptation activities existing in Belgium (evaluation of the impacts of climate change, vulnerability to this climate change and adaptation measures already implemented);
- to improve communication at national, European and international levels;
- to initiate a process for the preparation of a national action plan with a view to its approval in 2012.

– The Strategy summarises the expected impacts of climate change in Belgium in the health, tourism, agriculture, forestry, biodiversity, coastal and marine areas, town and country planning and flooding risk sectors. It also provides an overview of the adaptation measures which have already been taken in these sectors, as well as in two cross-cutting sectors: research and international co-operation.

– This strategy launched the process for the development of a National Adaptation Plan. In this context, the various levels of government (federal, Walloon, Flemish and Brussels Capital Regions) carried out studies with a view to preparing the future federal/regional adaptation plans which will provide the reference basis for the national adaptation plan.

The regional studies have allowed regional climate forecasts to be developed and information to be supplied concerning the vulnerability of the various sectors to future climate conditions.

They cover several themes, such as: water, agriculture, forestry, biodiversity, health, energy, infrastructure, town and country planning, industry and services, tourism, etc.

Several research programmes have also been launched to increase knowledge of climate change impacts and adaptation (for more details, see chapter 8).

Since not all the information (regional and federal aspects which are to serve as input when drawing up the plan) was available in 2012 to draw up the National Adaptation Plan, finalisation of this plan was postponed until 2013. It will specify how in future Belgium will prepare for climate change.

In 2013, the Flemish Region published its draft Regional Plan for Adaptation to Climate Change (Het Vlaams Klimaatbeleidsplan 2013-2020 [64]). The Walloon and Brussels Regions and the Federal Government are finalising their plans/instruments.

At institutional level, the national Adaptation Working Group, set up under the auspices of the National Climate Commission, is concentrating on the Belgian adaptation policy (preparation and monitoring of implementation). This Group brings together the operators at regional and federal levels. Its responsibilities include drawing up the National Adaptation Plan and the present chapter of the Communication.

Various intersectoral and intrasectoral focus groups have also been set up at regional and federal levels to bring together the representatives of the various (sub) sectors likely to be affected by climate change impacts (water, air, agriculture, biodiversity, transport, economic, health, town and country planning, etc.). The role of these focus groups is to exchange data, gather information on the adaptation measures currently undertaken by the various departments (bottom-up approach) and to identify the objectives and priority measures to be taken.

6.2. Forecast impacts of climate change in Belgium

6.2.1. Observed past trends

In 2013 the regional indicator report from the VMM [60] was published. The indicators from the report are regularly updated on their website [61]. In the area of climate change the report and website focus on emissions of greenhouse gasses, atmospheric concentrations of greenhouse gasses, temperature, precipitation, sea level, health effects from climate change and effect of climate change on nature. Starting from a general overview the website points out for each indicator the extremes and the evolution over the total period for Belgium. The climatic evolutions observed are plotted in graphs and the trends are visualised. An overview of the main conclusions is provided below, supported by a few figures [60; 61].

6.2.1.1. Temperature

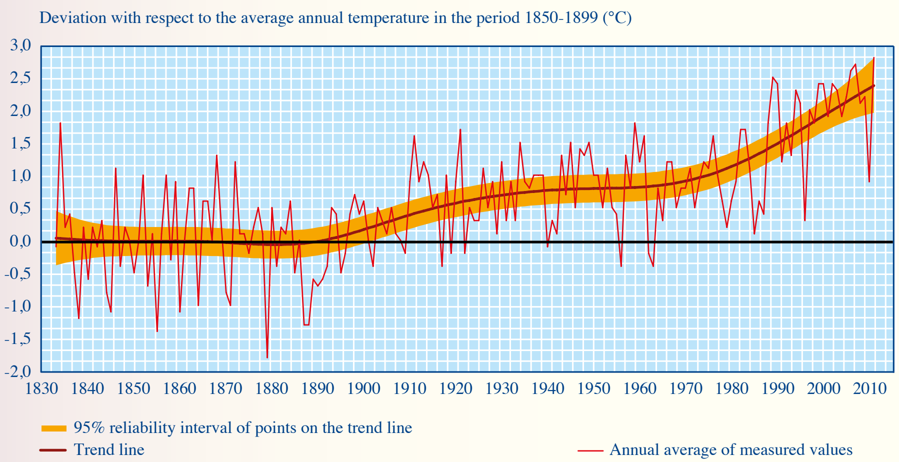
In Belgium too, the measurements show a clearly rising trend: statistical analysis of the annual average temperatures in Uccle indicates that the temperature has been rising significantly since the end of the 19th century. In the mid-20th century, the rise slows almost to a standstill, but subsequently the temperature started to rise even more rapidly. In recent years, the temperature has been rising constantly by +0.4°C per decade. The trend line shows that in the meantime it is on average 2.3°C warmer than in the pre-industrial period (figure 6.1).

With an average annual temperature of 11.6°C, 2011 holds the absolute record since measurements started in 1833. 2007 and 2006 complete the top 3 with 11.5°C and 11.4°C respectively. The 17 warmest years since 1833 all lie in the period 1989-2011, whereas the 20 coldest years occurred before 1895. With an average annual temperature of 10.6°C, 2012 just comes in the top 20 warmest years.

Figure 6.2 shows the seasonal temperature trend for Belgium. In all 4 seasons, a significant rise is in progress. Nevertheless, there are also differences:

- the temperature rise is the greatest in the spring, and the pattern of the rise is very similar to that of the an-

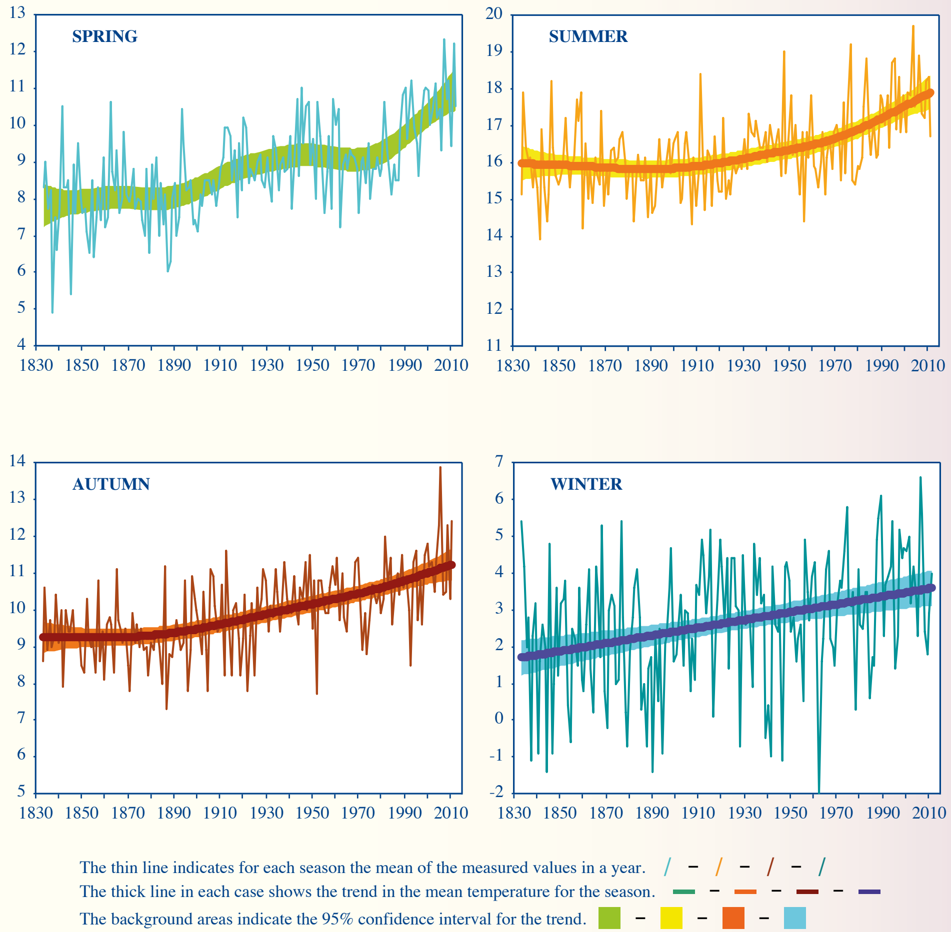
Figure 6.1 Analysis of trend in annual average temperature, expressed in terms of deviation from the reference period 1850-1899 (Uccle, 1833-2011) (See also section 2.3.2. Climat - temperature)



Because (certainly within Europe) the average annual temperatures in the pre-industrial period 1750-1799 were very similar to those in the period 1850-1899 and in this last period measurements for a lot more locations are available, 1850-1899 is used as the reference period for assessment against the 2°C target.

Source: MIRA (VMM) based on RMI data [60]

Figure 6.2 Mean temperature per season (°C) in Uccle, 1833-2012



Source: MIRA (VMM) based on RMI data [61] nual average temperature. The trend line shows that in 2011 the spring temperature was already 3.2°C higher than in 1833. The rise currently stands at +0.6°C per decade;

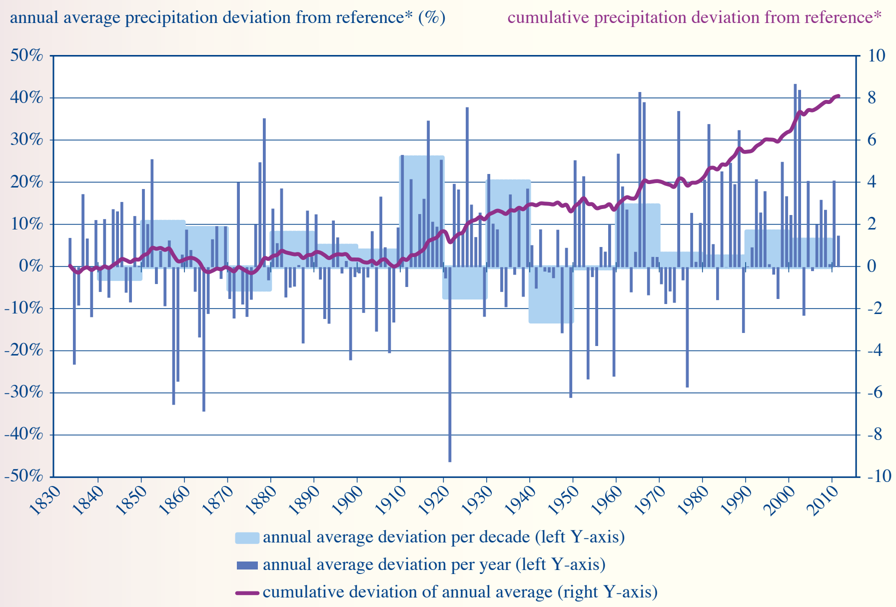
- in the summer months, the temperature is rising more gradually. The summer temperature is 1.9°C higher than when measurements started and the rate of increase now amounts to +0.3°C per decade;
- the autumn temperature comes out 2.0°C above the 1833 level, and is currently rising at 0.2°C per decade;
- of the 4 seasons, winter shows the greatest variation in average temperature. Nevertheless, over the years, the winter temperature has also risen significantly: +1.9°C higher than in 1833. The temperature rise amounts 0.1°C per decade.

If we examine the number of days occurring with very high and very low temperatures, a clear linear rising trend emerges for the number of summer days (Tmax ≥ 25°C) and the number of days of heat wave (Tmax ≥ 30°C): in each decade there are an extra 3 summer days and every 2 decades there is 1 extra day of heat wave. For the number of winter days (Tmax < 0°C) and frost days (Tmin < 0°C), the series shows a falling trend.

It appears from an analysis by the KMI [1] that, during the 20th century, Belgium was confronted with 1 heat wave every 2 years, but since the 1990s, this has doubled to an average of 1 heat wave per year.

In addition to the number of heat waves, it is also important to examine their duration (number of days during heat waves in a year), degree (the extent to which the tem-

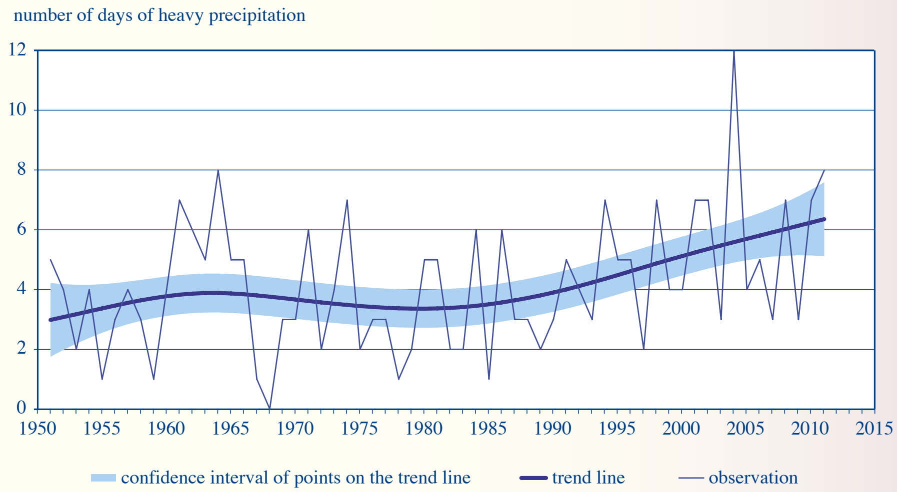
Figure 6.3 Analysis of the trend in annual average precipitation (Uccle, 1833-2011)



* annual average precipitation over the period 1850-1899, namely 758 mm

Source: MIRA (VMM) based on RMI data [60]

Figure 6.4 Number of days of heavy precipitation (≥ 20.0 mm per day) in Uccle (1951-2011)



Source: MIRA (VMM) based on RMI data [61] perature rises above 25°C) and intensity (ratio between degree and length) of the heat waves. Analysis for the period 1902-2011 also shows a wavy pattern for these 3 parameters with a rising trend since the 1970s. However, these rises are not significant [61].

6.2.1.2. Precipitation

The average precipitation in Uccle amounts to 780.1 mm/year [71]. With quantities of precipitation of 1088.5 and 1077.8 mm respectively, the years 2001 and 2002 hold the absolute records. With a total quantity of precipitation of 977 mm in Uccle, 2012 comes out just below the top 10 wettest years since measurements started in 1833.

In our country, more wet than dry years are occurring to an ever greater extent. Figure 6.3 depicts the deviation from the annual quantity of precipitation compared to the annual mean during the reference period 1850-1899. The trend towards wetter years is especially clear in the line showing the cumulative deviation. In the 19th century, this line fluctuated around zero: wetter and drier years offset one another. But since the beginning of the 20th century, there has been a clear increase, which has gathered pace from the 1970s. For the first time since the start of the measurements, we also see 5 decades in succession with annual average precipitation above that of the reference period (758 mm/year).

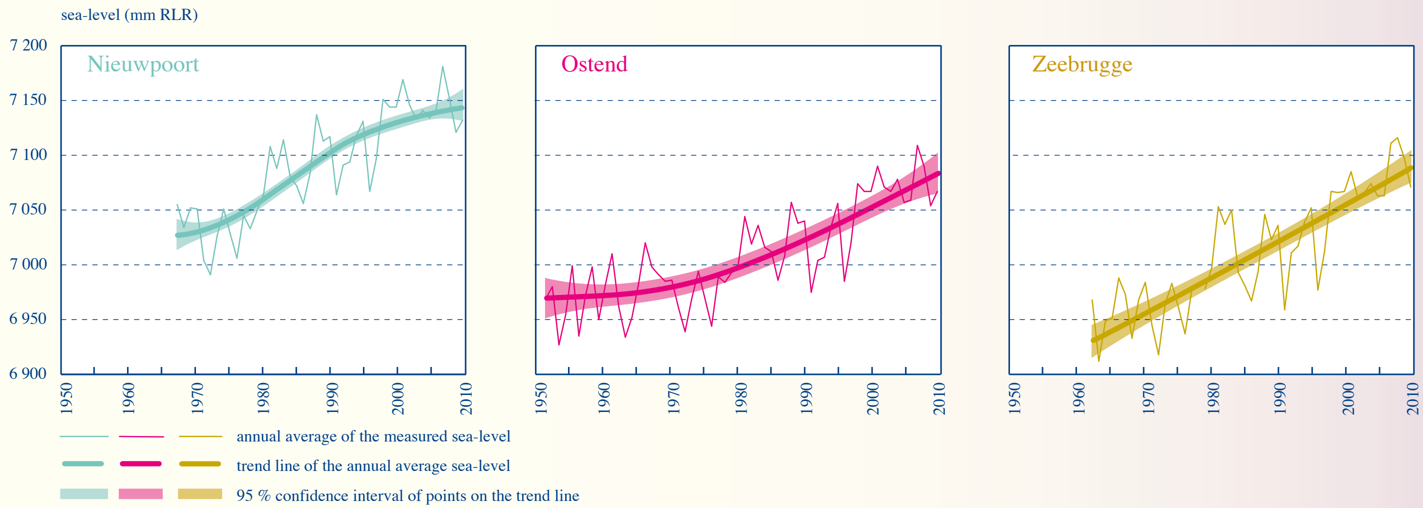
The quantity of precipitation shows very wide variability from one year to the next. However, statistical analysis of the entire data series is helpful to expose long-term trends. It appears from this analysis that our country is experiencing a slow, but significant rise in annual average precipitation. This rise is keeping to a linear pattern of 5 mm per decade.

If we examine the entire data series 1833-2011/2012, a significant rise in the quantity of precipitation in Belgium occurs only during the winter and the winter half of the year. The quantity of precipitation in the other seasons shows little, if any change. In recent decades (period since 1970), summer precipitation has also increased significantly.

Over the entire period 1833-2011, the number of days with measurable precipitation in a year increased significantly. This increase manifests itself in the winter and the spring. On the other hand, in the past decades (period 1970-2011), the number of days with precipitation per year tended to decrease, mainly in the spring and the autumn.

Belgium (Uccle) has an annual average of 4 days of what can be termed as heavy precipitation (at least 20 mm/day). The series of measurements of the number of days with heavy precipitation shows a clear trend: especially between the early 1980s and the late 1990s, the number of days of heavy precipitation showed a significant increase. In the meantime, a year on average already has twice as many days with heavy precipitation than in the early

Figure 6.5 Rising sea level at the Belgian coast (Nieuwpoort 1967-2010, Ostend 1951-2010, Zeebrugge 1962-2010)



The sea level is expressed in mm RLR (Revised Local Reference). The data of a local reference (for the Belgian coast this is the Second General Water Level (TAW - Tweede Algemene Waterpassing) are converted to the international reference level.

Source: MIRA based on PSMSL and Agency for Maritime and Coastal Services [60]

1950s: over 6 decades the average number has risen from 3 to 6 (figure 6.4). Intense precipitation usually occurs in the summer on account of intense thunderstorms which fall in a period of a few hours.

In relation to the higher temperatures recorded at the start and end of the 20th century, a report of the Belgian Royal Meteorological Institute (RMI) states that snow precipitations recorded at Uccle have become markedly less frequent. Snow cover is highly variable from one year to the next with no marked changes detected in the Brussels region, even though the amount of snowfall in recent years has generally been low. In contrast, on the Ardennes plateaux, in the Saint-Hubert region, maximum annual snow cover dropped quite significantly since winter warming began in the late 1980s [1].

The same RMI report reveals that in the case of wind, Uccle recorded a very marked fall in annual mean wind velocity during the second half of the 20th century. However, over the years the development of vegetation around the measurement site makes it impossible to attribute with certainty this trend to climate change alone. Elsewhere in the country, in some stations, wind measurements that are probably more reliable for the study of its changing characteristics have been recorded since the 1960s. An analysis of this data indicates a relatively severe reduction in wind velocity in the 1980s, with a slight accentuation of this trend since that time. This marked behaviour is also visible on a seasonal scale, with the exception of winter where the wind, which varies significantly from year to year, has been more 'stable' over the whole period. With regard to storms, studies conducted to date of strong winds, since 1940 in the case of Uccle and since 1985 elsewhere in the country, have revealed no particular trends, neither in the intensity of the strongest winds each year nor in the frequency of high winds. Similarly, an analysis of seasonal and annual hours of sunshine recorded at Uccle shows no overall trend for these parameters since records began in 1887, but instead a generally significant variability over a period of years [1].

6.2.1.3. Sea Level

The annual average sea level at the Belgian coast has shown a clear, significant rise at the 3 measurement points in the 1970s, 1980s and 1990s (figure 6.5). This rise is even greater after 2000, but is significant only for Ostend and Zeebrugge.

Compared to 1970, the annual average sea level in 2010 is already 103 mm higher in Ostend, 115 mm higher in Nieuwpoort and 133 mm higher in Zeebrugge. This is equivalent to an annual average rise of 2.6 mm/year, 2.9 mm/year and 3.3 mm/year respectively over the past 4 decades.

The rise in the sea level is also shown to fluctuate, with an interval of 18.61 years. As a result of variation of the angle between the earth, the sun and the moon, the sea level rises far more in some periods than in others.

A study by the European Environment Agency indicates that within Europe, Belgium, after the Netherlands, is the most vulnerable to flooding as a result of the rising sea level: in Flanders, 15% of the surface area is less than 5 metres above the average sea level. Moreover, the Belgian coastline appears to be the most built-up in Europe: in 2000, over 30% of the 10 km coastal strip was built up and as much as nearly 50% of the strip up to 1 km from the coastline [72]. In the Province of West Flanders, 33% of the population live in low-lying polder areas which are sensitive to flooding by the sea.

6.2.2. Climate change projections

Belgium is a small country on a climate zone scale and most climate models have a resolution between 50 and 300 km. It is thus not easy to provide climate change projections for the country. However, the publication of a number of climate change simulations has provided valuable information. Below are presented some elements coming from the new climatic projections elaborated in the frame of the recent regional impact and vulnerability assessments [2], [3], [32], [33], [69].

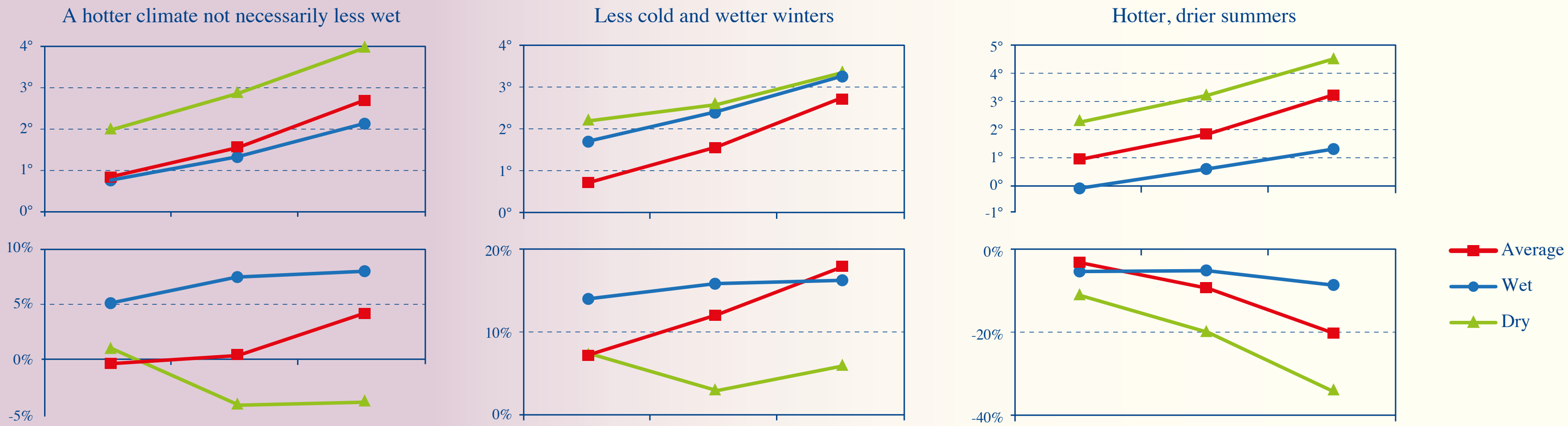
There is a dearth of climate change transformation tools especially for Belgium. This is partly explained by the lack of climate change scenarios relevant for local regions. Although regional climate scenarios became available with the completion of the PRUDENCE project in 2004, the number of climate models coupled with emission scenarios made it less obvious for users to synthesize. The CCI-HYDR project on "Climate change impact on hydrological extremes in Belgium" of the Belgian Science Policy Office (Programme "Science for a sustainable development") was set up primarily to synthesize the pertinent climate scenarios for Belgium. The project opted to focus on studying the high resolution regional climate models from the PRUDENCE project.

A perturbation algorithm has been developed so that impact analysts in Belgium can assess the hydrological impacts of climate change. The algorithm imparts a perturbation to an observed series to generate future time series. The observed time series are perturbed on the basis of four SRES scenarios (A1B, A2, B1 and B2). The climate model simulations with the A2 and B2 regional scenarios have been extracted from the PRUDENCE database while the A1B and B1 scenarios come from the IPCC AR4 database. [39]

New climatic projections have been built for the Belgian territory [2], [3], using the European project ENSEMBLES. Several models have been used, coupled with the SRES Scenario A1B (medium emissions scenario), to produce climatic projections. Another study which takes into account the 4 IPCC scenarios gives a broader image yielding slightly different and mostly higher values [32]. The results confirmed the trend and are described in the box below. They are expressed in comparison with a reference period (1961-1990) in the box below and in the following graphs (figures 6.6 & 6.7).

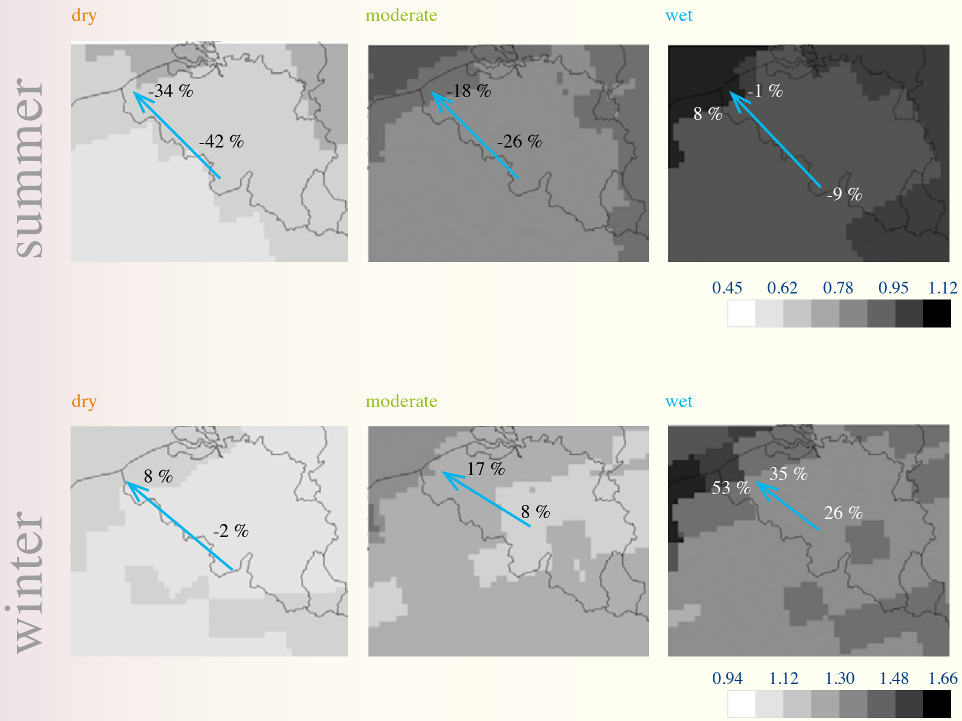
- **A hotter climate:** all the projections show an increase of the annual mean temperature (with scenario A1B: from +1.3°C to +2.8°C by 2050) and also an increase of temperature in all seasons (with all 4 SRES-scenarios: 1.5°C to 4.4°C for winter and 2.4°C to 7.2°C for summer by 2100).
- **A reinforcement of the seasonality of the precipitations:** precipitations are expected to decrease in summer (up to -25% by 2100) and increase in winter (up to 22% by 2100). Results for annual precipitation are contrasted: either a decrease or an increase depending on the models used.
- The possible change in precipitation also shows minor **regional differences** within Belgium (figure 6.7). In the coastal strip, the change is 10% greater than inland, both for the summer and the winter periods. For the summer period, this means that the fall in precipitation in the coastal strip is less extreme (the future climate is closer to the present climate). In the winter period, a further increase in precipitation by 10% means that the coastal strip will become wetter.
- **More extreme events:** heavy rains in winter and heavy thunderstorms in summer are expected to be more frequent or more intense, just as the heat waves that are expected to be more frequent in summer.
- **A fall in the average summer precipitation, in combination with greater evaporation, will cause the lowest river flows to fall during dry summers by more than 50% by the end of the 21st century.** As a result, the risks of a serious water shortage also increase.
- The sea level at the Belgian coast can rise with 60 to 90 cm with a worst case scenario of 200 cm.

Figure 6.6 Climatic trends (temperature and precipitation) coming from the mean, wet and dry projections built using the ENSEMBLES project. The 2030, 2050 and 2085 horizons are referring respectively to the periods 2016-2045, 2036-2065 and 2071-2100.



Source: ECORES & TEC [2]

Figure 6.7 Regional differences for the seasonal average precipitation according to the three climate scenarios (Belgium, scenario period 2071-2100 compared to reference period 1961-1990)



hydrological summer = April to September
hydrological winter = October to March
Results expressed as perturbation factors:

factor = 1 indicates no change;
factor = 1.2 indicates a 20% increase;
factor = 0.8 indicates a 20% decrease

Source: Environment Outlook 2030 Flanders [69]

The evolution rythms are different depending on the models used: the trend can be smooth and progressive or more abrupt and quick (e.g. the 2°C increase of annual temperature can occur already by 2030 with the 'dryer' models). Furthermore, these figures come from projections built with an intermediary emissions scenario. So, with a more pessimistic scenario, the results can be more severe. For example, the Environment Outlook 2030 Flanders [69] has used the SRES scenario A2 and obtained more extreme figures (e.g. up to +8.9°C in august by 2100).

6.2.3. Extremes

The probability of severe heat waves is expected to rise significantly. The heat island effect in cities is mentioned in the recent vulnerability assessments [2], [3].

With regard to extreme events, the floods recorded in Belgium have already become more frequent over recent decades. Major floods occurred in 1995, 1998, 2002, 2003, 2005 [9] and more recently 2010[43] [10] and 2011. Land management is clearly responsible in part for these floods, although variations in winter precipitations and increased frequency of heavy rainfalls (especially in summer) have further exacerbated the risk of flooding [9, 70]. According to regional vulnerability assessments, projections show a heavy increase in the volume of precipitations within the December-January-Februrary quarter [2], [3]. This will surely lead to higher risk of floods. Furthermore, we have seen in the past that intense precipitations also happen during the summer.

The European Research Project AMICE [11] has studied the impacts of climate change on the whole Meuse basin. Depending on the scenarios, and on the different regions and their land use, the costs of the damage can be more or less significant. For instance, in Wallonia (one of the region's the most affected), the total cost of flood damage is expected to increase by 135% to 365% by 2100.

6.2.4. Mean sea level

Changes in sea level will not be the same in all parts of the world, but not much is known about future regional variations. Regional changes stem from variations in thermal expansion, changes in ocean currents, and land movements (in particular postglacial rebound). The CLIMAR study (conducted by BELSPO) [13] has taken into account the sea level rise and shows a rise of 60 to 90 cm, or up to 2 meters under an extreme scenario (for more particular information, see chapter 'coastal management').

[43] According to national evaluations, the costs of the damage due to the floods of November 2010 has reached EUR 178 millions in Belgium [10]

Beyond the 21st century

Part of carbon dioxide emissions remain in the atmosphere for centuries. If concentrations are stabilised due to a large reduction in emissions, the temperature increase will nevertheless continue. In a moderate scenario (which, however, is being increasingly challenged), we may consider a stabilisation at 550 ppm CO_2[44] (depending on model sensitivity, this may be consistent with the EU target of limiting mean temperature increase to 2°C from the pre-industrial to 2100). When the results presented by the IPCC are added up, this leads to a rise by the year 3000 in the global mean sea level between 4 and 8 metres (0.5-1.5m from thermal expansion, 3m from Greenland ice, 0-3m for Antarctic ice, 0.5m for glaciers).

While most climate models predict a slowdown of oceanic circulation in the North Atlantic[45] (part of the planetary thermohaline circulation), current projections do not suggest that it will stop during the 21st century. The probability of this major event is not well known for the next centuries. It is a possibility, particularly following a large-scale and rapid increase in greenhouse gas concentrations. If the circulation changes, and in particular if the Gulf Stream (or more specifically the North-Atlantic drift) stops, projections suggest that in Europe the mean temperature would rise less but would not be replaced by cooling (for the annual mean: seasonal changes may be more complex, causing a further disruption of the climate). In addition, a shutdown of the thermohaline circulation would cause a rapid rise in regional sea level along European coasts [14]: some 30 cm in a few years (and close to a metre after many centuries).

6.3. Vulnerability assessment and climate-change adaptation measures

6.3.1.Water management

6.3.1.1. Water resources

6.3.1.1.1. Impacts and vulnerabilities

According to a report of the EEA, Belgium makes an intensive use of its water resources (Belgian Water Exploitation Index > 20%) [12]. Nevertheless, a closer look at this indicator reveals that two-thirds of the total amount of extracted water in Belgium is used to cool down power stations. The manufacturing industry accounts for one fifth of the water extractions and public water distribution for barely 10%. The share of the agricultural sector is quite marginal. Compared to other countries, Belgium has a distinct profile. Extractions for electricity production are higher than the European average. The agricultural sector extracts very little water in Belgium, the EU average for these extractions is 20%. Industry uses comparatively considerable more water in Belgium than in the rest of the EU. Public distribution represents hardly 10% of the extractions in Belgium, compared to 20% in Europe [13].

Considering these typical characteristics, one of the major problems Belgium will face will be cooling water. Due to the predicted temperature increase the cooling effect of this water will be lower, and furthermore the availability of water will be substantially affected during the driest periods.

Concerning groundwater, dry summers, with increased evaporation and possibly reduced precipitation, will probably reduce the groundwater level significantly ([28], [31]). In contrast, higher winter precipitation will increase groundwater recharge. Changes to aquifer level have consequences on the timescale of a year or more, and should thus partly cancel each other out. Water management is already an important concern in Flanders, which imports a significant fraction of its drinking water from Wallonia. Climate change will bring additional pressure on water resources, especially in summer. During present-day dry years, less water is also available in canals, so that groups of ships have to cross the locks together. Reduced water flow in summer may also have an impact on surface water quality.

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[44] Pre-industrial CO_2 concentrations were about 280 ppm, concentrations at the beginning of the 21st century are around 375 ppm.

[45] In 2001, a report in the journal Nature indicated that the deep-water current flowing from the Nordic seas of Norway and Greenland into the North Atlantic had reduced by almost 20% since 1950.

From a more qualitative point of view, variations in flow can intensify pollution in surface water. In fact, concentration of pollutants is higher where water levels are markedly low. Moreover, the rise in the water temperature during these same periods (which in the future are likely to be more marked in summer) can reduce the oxygen saturation rate, which could damage the survival of fish and other aquatic organisms. On the contrary, heavier precipitations may cause floods which can spread the potential pollution either on the ground or deep in the soil by leaching.

A microclimate survey on the effects of climate change on water resources management for the Region of Brussels will start soon. The objective is to elucidate the influence of climate change on water resources, related to floods and to water shortage, and to propose vulnerability indicators, particularly for groundwater.[46]

6.3.1.1.2. Adaptation measures

Steps have been taken to resolve current water management problems in Flanders which will help mitigate the shortage of water resources. A large-scale information campaign to promote water savings was launched in 2000 and is still under way. The framework of flood prevention will also contribute to water availability.

As an example to both resolve water shortage and to use the excess of water on the Albert canal the biggest European Archimedes screw has been installed. In case of low levels, water can be pumped up to a higher body of the canal. In case of high water the pumps can be used as electricity generator. The pumps are fish friendly [53].

Meanwhile the standard building specifications related to waterways have been adapted to climate change with a temperature rise of 2°C.

Current measures to improve surface and groundwater quality (e.g. in connection with nitrates from agricultural fertilizers) will help sustain the availability of affordable drinking water.

In the Brussels region, since 2004 the surveillance of aquifer levels has been coupled with monitoring of their quality. In 2012, the Brussels-Capital Region adopted a regional water management plan in the aim to find an integrated and global approach to all the challenges related to water management. This plan provides measures to stimulate sustainable use of water and to restore the Region's hydrographic water network. It includes inter alia a programme for rational water use in urban areas being developed in the framework of sustainable urban design and eco-construction projects.

6.3.1.2. Floods

6.3.1.2.1. Adaptation measures

In the Walloon region, a flood prevention plan was approved in 2003 (plan PLUIES for Prévention et LUtte contre les Inondations et leurs Effets sur les Sinistrés - prevention and control of floods and their damage). This global plan aims to improve knowledge of the risk of flooding, reduce and decelerate the run-off of water on slopes, improve the management of rivers, decrease vulnerability in zones liable to flooding and improve crisis management. Real-time monitoring of watercourses, hydrology studies, coordination and flood alert are operational. The PLUIES plan will be amended to transpose the EU Floods Directive. The future flood risks management plans (PGRI for Plan de Gestion des Risques Inondations) will integrate the principles based on the 3 P: Prevention, Protection and Preparation.

In the Brussels region, the "Plan de prévention des inondations – Plan Pluie" (PLUIE flood prevention plan), of 2008, which is now a part of the Regional Water Management Plan of 2012 adopts both a preventive and palliative approach. Preventive measures can help ensure that the built environment is better adapted to increased precipitation, both in terms of improved soil infiltration and short-term water retention on plots of land. Various measures are being implemented to recover rainwater (installation of rainwater tanks is compulsory for new housing and promoted through regional grants for existing housing) and to increase infiltration and evapotranspiration (limit on built-up areas, choice of permeable materials, plantings and green roofs).

The 'blue network' implemented since 1999 by the Region is an integrated programme for the purification of Brussels' rivers and water bodies. It aims to restore the continuity of the hydrographic system and benefit from its 'flood buffer' function by recovering clean run-off water. In the Brussels Region, the sewage system is an all-in-one network:

The drawback of this system is that in dry weather or periods of light rainfall, wastewater reaching purification stations is needlessly diluted whereas when rainfall is intense, it becomes engorged and causes flooding of highly polluted water. This programme also contributes to the upgrading of rivers, ponds and wetlands in urban areas.

The principal palliative measure is the construction of a network of storm drains, generally connected to the sewer network. When rainfall is very heavy, these drains enable runoff water to be stored in order to regulate wastewater flow within the sewer system. The Region has more than thirty storm drains, some of which have a capacity of 30 000 m^3. They are big enough to absorb a 10 year flood. If the volume of heavy rains increases by 10%, a possibility within 50 to 100 years, this level would

[46] This will complement the study on the validation of data on the rainfall measuring network managed by the IBGE/BIM, distribution of precipitations qualitative analysis of the measurement sites and the micro climate project in the Brussels-Capital Region conducted in 2010 by the RMI. This study presents a special type of urban hydrological modelling performed using a model suitable area for impact studies. This model was used to study the relative roles of climate change and the degree of impermeability of the surface in the Brussels Region on flow, runoff and water balance.

drop to flooding likely to occur around every six years. Some drains are still at the planning stage.

In Flanders, building plans, as well as any plan that might have an impact on water, are checked for their hydrological consequences (a procedure called "watertoets", within the framework of the Coördinatiecommissie Integraal Waterbeleid). It applies particularly to zones prone to flooding, important for infiltration, or close to a drinking water catchment area. The objective is to avoid negative impacts on the water system, but also to reduce the risk and consequences of flooding. As a consequence, the authorities can demand specific measures if required, such as the use of permeable ground surfaces. In specific situations, a building project may be rejected as a result of the process even in areas formerly indicated as suitable for building. Maps identifying flood risks have been prepared to facilitate the implementation of these measures.

Scenarios are drawn up and prepared for reaction in case of emergency situations.

The next River Basin Management Plans will included a climate check.

At the federal level, coverage against flooding and other natural hazards has been included in household fire insurance policies since 2007.

Royal Decree of 28 February 2007 defines "high risk areas" on the basis of maps developed by the Regions.

If a new construction is located in a "high risk area", the insurer is not required to provide coverage against flood damage.[47]

For existing constructions in high-risk areas, there is a solidarity mechanism (price setting board) to limit the premiums by sharing the cost among all insured parties.

While the legislation is not primarily targeted at adaptation to climate change, it has a dissuasive effect on residential construction in areas where the risk of flooding is high.

The flood maps are available for Wallonia (http://geoportail.wallonie.be/cms/fr/sites/geoportail/home.html) and Flanders (http://geovlaanderen.agiv.be/geovlaanderen/watertoets2012/) [51], [52]. For the Brussels Region, only maps based on previous floods are available [14].

The research programme for earth observation "STEREO II" (2006 - 2013) funded by the Belgian Federal Government and managed by the Federal Science Policy Office (BELSPO) aims to develop an autonomous Belgian Earth observation expertise. Under STEREO II, the research project 'Flood mapping and soil moisture retrieval for improved water management' (FLOODMOIST) aims to:

– explore new strategies to extract hydrology-related information from microwave remote sensing (i.e. soil moisture and flood extent)
– demonstrate the merit of jointly assimilating soil moisture and flood extent information into coupled hydrologic-hydraulic models.

Flood prediction systems are of key importance for properly managing an event and organizing rescue operations. Unfortunately, the models used cause errors with respect to timing, flood extent or stage height. This spin-off project will investigate how radar remote sensing observations of soil moisture and flood extent can be jointly assimilated into flood prediction systems.

6.3.2. Coastal management

6.3.2.1. Impacts and vulnerabilities

In conjunction with the transport of melting land ice towards the sea, the thermal expansion of seawater is the major cause of the rise in sea level that has already been observed. The temperature influences the density of the water and consequently, currents and sea level.

In the 20th century, sea level on earth rose by 1.7 mm on average each year. Since the fifties, there has been a significant acceleration in the rise in sea level. The annual rise in sea level is now already 3.4 mm per year (global average).

The Belgian coast follows that global trend. Statistical analysis of Belgian coast measurement values shows a clear and significant increase in the annual average sea level for the three measurement locations (Oostende, Nieuwpoort and Zeebrugge) in the seventies, eighties and nineties (also see the figure in § 6.2.1.3).

Extrapolation of this historical trend leads to a moderate climate scenario with an average rise in sea level of 6 mm/year (or 60 cm by 2100) and a warm scenario with an accelerated average rise in sea level of 9 mm/year (or 90 cm by 2100).

A worst case scenario, in which a rise of 200 cm is expected, has also been determined in addition to these two scenarios. Simulations show an increase of around 10% in the current around Nieuwpoort as well as a significant increase in wave height close to the coast. These results will be further refined in the future. The value of 200 cm is used, for example, to demonstrate 'robust' measures. These are measures that have an added value, regardless of the scenario.

In addition to the average sea level, it is also important to know how storm surges evolve (in storms during the highest tide levels).

Measurements of significant wave height between 1978 and 2007, and wind speed variables between 1980 and 2007, were analysed at the same time as wind fields, by the Norwegian Meteorological Institute. No clear trend emerged from

[47] Law of 25 June 1992 on insurance contracts, modified by the law of 17 September 2005

these temporal series. A slight reduction in significant wave height seems apparent at Westhinder. Similarly wind speed on the Belgian coast has shown a slight reduction, in particular since 1990-1995. This supports recent research suggesting that there has been a reduction in the frequency of storms in the Southern Bay of the North Sea. However, as this reduction is only observed during the last years, this period is too short to make conclusions on a change in climatological behavior of storms.

The scenarios provide an average central estimate of +41 cm in the period from 1990 to 2040, or an average of +8 mm/year, for storm surges, in addition to the increase because of the rise in sea level. These values correspond to the upper limit of IPCC estimates from 2007.

Based on these scenarios, hydrodynamic models, wave models and sediment transport models demonstrate that currents may increase up to 10% for Nieuwpoort and that waves close to the beach may increase significantly. Wave height also appears to have a periodic natural variability.

As a result of the rise in sea level, more salt water will flow into the groundwater reservoir at the coastline and in port areas, placing fresh water reserves in the dune area under pressure. Low rainfall and greater evapotranspiration will increase salinity. If no measures are taken to combat salinity, fresh water extraction will have to decrease and possibly be relocated. The greater influx of salt water also leads to increased salt seepage into the adjoining polder area, resulting in salinisation of the farming land and ecosystems that are dependent on groundwater. The increased seepage causes a rise in the groundwater level of the polders, which in turn leads to a decrease in storage capacity and a need for more drainage.

One-third of the 67 km long Belgian coast is inadequately protected against what are known as super storms. This is clear from a study that the Coastal Division carried out to investigate how the Flemish coast can be brought up to a minimum safety standard against a very severe storm.

Every metre of the relatively short Belgian coastal area is used intensively. The ten coastal cities and municipalities not only include important seaside resorts but also the two major commercial ports of Zeebrugge and Oostende with their industrial areas located behind them. There are also four recreational marinas at Nieuwpoort, Oostende, Blankenberge and Zeebrugge and a number of valuable nature conservation areas, such as Westhoek, Ijzermonding, De Fonteintjes and Zwin.

6.3.2.2. Adaptation measures

The ten Flemish coastal municipalities have agreed to the **Masterplan Kustveiligheid** (Coastal Safety Master Plan) for strengthening seawalls. The Flemish Government also approved this master plan on 10 June 2011 [38].

The purpose of this coastal safety master plan is to protect the entire coast against flooding in the long term. The emphasis of this master plan lies firstly on the implementation of the chosen protection measures that are necessary to ensure continued coastal safety. There is also a major focus on climate change. An anticipated 30-centimetre rise in sea level by 2050 has been taken into account and it has been verified whether the long-term measures can be flexibly adapted to greater levels of protection and rises in sea level.

There are three forms of sea defences along the Belgian coast: natural, hard and soft sea defences. There are also breakwaters and groynes.

More than half of the Flemish coast is protected against the sea by one or more man-made reinforcements. However, a new vision in relation to sea defences became increasingly popular in the second half of the 20th century. The natural form of sea defences gained ground. In the last few decades of the 20th century, the Coastal Division stopped building new dykes. The hard structures were maintained and transformed into attractive promenades. In addition to their sea defence function, dykes acquired a new recreational purpose.

Today, the Coastal Division takes mainly the natural dynamics of the Flemish coast together with the interaction between the beach and currents, and the waves and wind into consideration for achieving safe sea defences.

Numerous studies, as well as experiences exchanged both domestically and abroad, show that solid dunes and broad high-lying beaches form the best natural protection against storms and flooding.

In order to examine which measures could be taken to provide the necessary protection for the coast, a list of possible measures for securing the primary sea defences was drawn up. Several measures were selected on the basis of a number of relevant criteria for the purpose of detailing the specific solutions. However, the selected building blocks that were studied for the focus areas are not effective or feasible in all types of coastal environments.

A distinction was made among three types of environments:

– Seaside resorts: these are located in a more urbanised environment. Both soft and hard engineering measures can be implemented here.
– Dunes: these are located in a more natural environment, characterised by the presence of dunes. Soft engineering methods can be implemented here.
– Ports: these are located in a harbour area. Only hard engineering methods can be implemented here.

A number of alternative measures were further studied for each type of environment: dune expansion, beach expansion, storm walls and storm surge defences.

6.3.3. Biodiversity (land and sea)

6.3.3.1. Biodiversity on land

6.3.3.1.1. Impacts and vulnerabilities

Climate change is already having a perceptible impact on biodiversity and its ability to provide the services that have been enjoyed by society and the wider economy (ecosystem-related services providing environmental and quality of life benefits).

About 20-30% of animal and vegetable species would be at increased risk of extinction if the average global temperature were to rise by more than 1.5-2.5°C.

Climate change is exacerbating the threats to biodiversity (such as habitat fragmentation and destruction, pollution, overexploitation and even biological invasions) by affecting:

– the geographical distribution of species. Many European plant and animal species have already altered their ranges in response to climatic changes that have already occurred. Many warm-weather species are moving north. The presence and number of species originating from hot to temperate climates have increased over the last few decades in Belgium. For example, nine species of southern dragonflies, such as the scarlet dragonfly, are now to be found in Wallonia. Other insect groups would seem to be undergoing similar changes (orthopteroids, hymenoptera and lepidoptera), as are certain species of Arachnids (such as the wasp spider, native to the Mediterranean Basin) and birds (such as the European bee-eater, a southern species which is now nesting in Belgium). In particular, the effects of climate change may be conducive to certain pests (proliferation of ticks, pine processionaries, etc.).

  At the same time, certain species present in Belgium will be moving further north.

  The pace of climate change is, however, outstripping the ability of many species to adapt and migrate, particularly where species are prevented from moving by habitat fragmentation or cannot find suitable habitats.

  The range limits for certain species will contract or even disappear (ROOT et al., 2003 [66]). Some bird species (such as the Brambling and Common Redpoll) are in danger of disappearing entirely from Flanders in the future due to the rise in temperatures during their breeding season (Natuurrapport Vlaanderen: NARA 2009 [47]);

– the life cycle of certain species. The temperature rise is advancing certain Spring events, such as the opening of buds (which is occurring 5-15 days earlier than 50 years ago), and delaying Autumn events, such leaf-colour change (4-8 days later). On average, the pollen season is ten days earlier in Europe and lasts for longer than was the case 50 years ago [43]. Other phenological changes have been studied in Belgium in relation to certain caterpillar populations, which hatch sooner (and cannot find enough to eat) if spring comes early (VISSER & RIENKS, 2003). In general, migratory birds are arriving earlier due to the increasingly frequent warm winters.[48]

  The emergence in the Spring of the first dragonflies advanced steadily between 1984 and 2006 (the degree of change varies considerably between the species, however) [16]. On average, the dragonfly flight season has increased by two weeks over the past 20 years, coinciding with the increase in the number of southern dragonflies.

  Climate change is regarded as the main cause of these changes.

  Phenological changes caused by climate change could pose a threat for biodiversity by changing how species interact (this is the case, for example, of the European Pied Flycatcher: the arrival date of this migratory species has not kept pace with the earlier emergence of the principal food for its chicks);

– interaction between organisms. Climate change may disrupt the interaction between species (competition, predation, parasitism, pollination, commensalism, etc.), but also generate new interrelationships. Threats posed for individual species are often exacerbated by changes to interspecies interactions, particularly in the case of so-called specialised species. The arrival of new species adapted to the new climatic conditions may pose a threat to the structure of the existing ecosystems and the services they provide;

– proliferation of invasive species. As a result of climate change, certain exotic species (imported or moving north) can become invasive, that is to say, develop at an uncontrollable pace at the expense of indigenous species. Given the ability of these species to adapt to highly diverse climate conditions and their wide geographical spread, they are likely to adapt more easily to climate change than native species. This is the case, for example, with the Red-eared Slider (whose reproduction has been limited up to now by low water temperatures);

– The emergence of pests and diseases. Climate change amplifies food safety risks and contributes to a decline in habitat quality.

While not the key factor, climate change would therefore seem to be partly responsible for the disappearance of certain species (and the emergence of others) and habitats in Belgium. This trend is likely to accelerate in the future.

[48] The arrival dates for 15 species has been monitored over a 20-year period. Their arrival dates have advanced by 7.63 days on average (i.e. 0.45 days/year). The greatest change recorded was for the Common Chiffchaff (20 days in total, i.e. 1.16 days/year)[15].

The changes to the composition (inter and intra-species) of biodiversity that will be brought about by climate change are hard to predict. They will also lead to changes in the way ecosystems work and in the services they provide (water purification, pollination, food supply, etc.).

6.3.3.1.2. Climate-change adaptation measures

Adaptation measures in the field of biodiversity are aimed, among others, at helping to:

– protect biodiversity by reducing non-climate-based restrictions;
– foster species movement dynamics (combating fragmentation, creating migration corridors, establishing additional protected areas and buffer zones along the edges of protected areas, etc.).
– preserve areas which are less vulnerable to climate change and which can become "climate refugia";
– move and/or conserve elsewhere species incapable of migrating;
– control parasites, diseases and invasive species.

These measures preserve the supply of ecosystem services essential for adapting to climate change (wetlands provide natural protection against flooding, vegetation helps to improve the quantity and quality of water locally, green spaces help to improve the micro-climate and the quality of air in towns, etc.) and slowing climate change (thanks, in particular, to carbon absorption by marine and land ecosystems).

There are measures in Belgium aimed at providing better protection for biodiversity, but these sometimes need slight adjustment to respond more effectively to the anticipated impacts of climate change.

Belgium's National Biodiversity Strategy (currently being updated) sets out a series of priority objectives for anticipating, preventing and reducing the causes of loss of biodiversity in Belgium. It adopts an ecosystem-based approach targeting integrated management of land, water and living resources and advocates adaptive biodiversity management. One of its objectives is, notably, to "Study and monitor the effects of climate change on biodiversity'.

The draft updated version reflects in particular the new European and international commitments in the field of biodiversity, and, more specifically, the new 2011-2020 strategic plan adopted in 2010 at Nagoya and the new European biodiversity strategy for 2020. Among other things, this updated version confirms the importance of green infrastructures[49] as one of the ways to maintain and improve ecosystems, their resilience and their services, thereby contributing to mitigation of and adjustment to climate change and to combating desertification.[50]

A number of mutually complementary measures have been taken in Belgium, including:

– Establishing a network of protected areas (Natura 2000) by the three Regions, and at Federal level for the marine environment. 234 special protection areas have been designated for the purposes of the Birds Directive and 280 special conservation areas for the purposes of the Habitats Directive, making a total of 458 Natura 2000 sites and corresponding to a total surface area of 5 136 km² (http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm – 2011 [67]).
– Establishing a (partial) classification of the species present in Belgium based on their climate needs (bioclimatic classification of species).
– Combating fragmentation (e.g. blue and green network in the Brussels region, defragmentation of rivers (dams and locks) so that fish can migrate along a 3 000-km priority network in Flanders (covering the key reproduction areas and migration routes) [17], grants in Wallonia for the planting and maintenance of indigenous hedgerows, orchards and rows of trees, components of the ecological network sheltering characteristic fauna and flora and providing other services (reducing erosion from wind and rain, etc.).
– Implementing a common approach to preventing the introduction of invasive species and limiting their propagation: development of warning lists based on a standard environmental impact assessment protocol (Belgian Forum on Invasive Species - http://ias.biodiversity.be), eradication programmes, review of existing legislation designed to prevent the introduction of invasive species (under way), etc.
– Strengthening agricultural biodiversity (through agri-environmental measures).
– Diversifying species to improve resilience to climate change (forests, green spaces, etc.).
– Monitoring the effects of climate change on biodiversity.
– Developing (and mapping) an economic assessment of ecosystem services [18] (to provide a more effective measure of the cost-benefits of the various adaptation measures).
– Workshops (one workshop organised by Natuurpunt and financed by the Belgian Government on the migration of species due to climate change [70], and one workshop organised by Natuurpunt, in conjunction with the fire service and the environmental agency, on heathland drought and fires [71]).

[49] A green infrastructure is defined as follows: a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, green infrastructure is present in rural and urban settings. (COM(2013) 249).

[50] Objective 3.3 of the updated biodiversity strategy: "Ecosystems, their resilience and their services can be maintained and enhanced by, inter alia, putting a green infrastructure in place and by restoring at least 15% of degraded ecosystems".

Biodiversity in towns is the focus of particular concern. The "greening" of towns: the green transformation of towns has been the subject of a study on how to meet the challenges presented by climate change. The findings of that study were published in a brochure ('Investeer in groen – winst verzekerd' [Invest in green – a guaranteed return] [42]).

6.3.3.2. Marine biodiversity

6.3.3.2.1. Impacts and vulnerabilities

Climate change results in changes in abiotic (temperature, sea level, acidification, etc.) and biotic (primary production, food webs) factors. Climate change will have an impact on the food chain at various levels, on food supply, and on the distribution and life cycle of certain species, resulting in a change to the composition of species and to the entire ecosystem.

The spatial distribution of commercially important marine species in Belgium, such as sole, plaice or cod, is already adversely affected by climate change.

For example, changes in zoo- and phytoplankton are having a direct impact on sand eels, affecting the reproduction of many sea birds, such as puffins (CLIMAR 2008b).

6.3.3.2.1.1. Water temperature

Water temperature is rising across the North Sea (not just in the Belgian part). It would also seem to have a natural 7-8-year cyclical variation.

The water temperature of the North Sea is currently rising by 0.023°C a year in the north and 0.053°C a year in the central and southern part (Van den Eynde et al, 2009).

The temperature of the Belgian North Sea is expected to rise by 2.5-3.5°C, depending on the scenario chosen, between now and the year 2100 (CLIMAR 2008a).

More and more marine organisms are changing their distribution as a result of this rise; increasing numbers of warm-water species can be seen in Belgian waters (sardines, anchovies, etc.). For their part, species that live in colder waters (cod, haddock, halibut, brown shrimp, etc.) are migrating further north (CLIMAR 2008).

The movement northwards has been around 10° in latitude (1 100 km) over the past 40 years and would seem to have accelerated since the year 2000. Subtropical species are increasingly present in European waters [43].

More southern commercial fish species (such as mullet) which are not important for Belgian fishing are currently to be found in great numbers in the North Sea. Climate change is likely to result in major changes to commercial fishing due to the shifts in species distribution.

The higher temperature is also leading to earlier arrival of certain marine organisms in their seasonal cycles in European waters. Some plankton species, for instance, have advanced their season cycle by 4-6 weeks over the past few decades. Phenological changes in plankton have major consequences for the structure of marine food webs, intensifying, for example, the vulnerability of cod in the North Sea [19, 43].

Finally, the temperature rise will lead to the proliferation of algae species that are potentially harmful to marine organisms and human health (CLIMAR 2008b).

In addition, the temperature is also affecting the solubility of CO_2 in water, which undoubtedly will not be without impact on water acidification.

6.3.3.2.1.2. Sea level

The sea level is currently rising (see 6.2.2.3).

Various scenarios have been drawn up for Belgium (see the chapter on 'coastal management') based on analysis of the literature available and the scenarios developed by neighbouring countries.

6.3.3.2.1.3. Acidification

Observations collected over the past 25 years show a steady trend towards increasingly acid surface waters as a result of the increase in CO_2 in the atmosphere. The pH value of surface waters has fallen by 0.1 of a unit since the start of the industrial revolution, equating to a 30% increase in acidity. Based on the (IPCC - Intergovernmental Panel on Climate Change) emissions reduction scenarios, the pH value will fall by 0.4 ± 0.1 of a unit in 2100 as compared with the start of the industrial revolution (Orr *et al.*, 2009).

Acidification has increased a hundred times more quickly over the past few decades than in the last 55 million years [43].

Acidification is affecting and will continue to affect numerous marine organisms (in particular those using calcium carbonate, such as shell fish, sea urchins, etc.), marine ecosystems and fishing.

6.3.3.2.2. Climate-change adaptation measures

The 2012-2013 Marine Spatial Plan for the North Sea, drawn up by the Federal Government, establishes a structural plan for the North Sea.

The North Sea species and habitats under threat are monitored and protected.

The protection provided includes implementation of a network of protected marine areas. Five protected marine areas were designated in the Natura 2000 network along with a marine reserve in the Heist Bay area.

Preservation of the marine environment also means combating pollution and managing the equipment used for this purpose, as well as a zero-tolerance policy designed to prevent pollution.

With regard to the rising sea level, the measures recommended up to the end of the 1980s focussed on the construction of sea walls to combat flood risk. In view of the impact of these structures on beach erosion, Belgium has favoured the resanding of beaches since the 1990s. Sea walls have nevertheless been maintained because of the defensive function (see the section on 'coastal areas").

6.3.4. Agriculture

6.3.4.1. Impacts and vulnerabilities

In Belgium, the vulnerability of agriculture to impacts of climate change is not in general the more severe compared to other sectors. Indeed, some agricultural practices can be adapted annually (contrary to forestry practices for example) to decrease exposure to the impacts of climate change.

Nevertheless some elements should be pointed out. If increases in temperature and carbon dioxide concentration are supposed to be at the origin of increase of yields, this positive effect will be limited in time by lower soil fertility or water availability or the photoperiod. Furthermore, a rise in temperature can bring conditions more favourable to the development and spread of new diseases, pathogens and insect pests (for example the bluetongue disease transmitted by a mosquito and never observed in Belgium before 2006) which will affect livestock and crops (see also the example in the box below).

A greater frequency of extreme events or conditions is expected (periods of drought, flooding and erosion due to heavy precipitations), which can lead to severe damage. Depending on when it occurs (at which growing phase), the crops can be more or less affected and the final impact can be more or less important.

Soils play an important role in the resilience of agriculture. Unfortunately, heavy rains are responsible for a heavy loss of these soils by erosion. This is expected to be a major issue in Belgium. Erosion is responsible for the loss of soil but the movement of this soil causes problems like mudflows and flooding downstream.

6.3.4.2. Adaptation measures

In Belgium, the conditionality (of the payment of European subsidies to the agricultural sector) linked to compliance with environmental provisions in force is already encouraging the maintenance of permanent meadows. Moreover, the Programme for the Sustainable Management of Nitrogen in Agriculture, transposing the Nitrate Directive in Wallonia incorporates a coherent set of obligations to encourage the maintenance of soil humus content: sustainable management of organic matter via soil binding, winter land cover, etc. Climate change is also one of the key challenges of the new period of programming for rural development. The new program is under elaboration.

The example of the 2007 aphid invasion

Aphids are one example of parasites. In the growing conditions prevailing in Belgium, the wheat aphid is one of the most damaging. The warm weather in January 2007 allowed wheat aphids to swarm (swarming, which results in females laying their eggs in wheat ears, generally occurs in the Spring). Up to 20% of wheat fields were infested before a brief freeze occurred between 15 and 20 January. This is unheard of in Belgium. This premature aphid development shows the importance of temperatures and periods of freezing (Deproft, 2007) [5].

A study was undertaken in 2008 by the KUL in the gaim to create an inventory of adaptation opportunities within Flemish agriculture and horticulture and to try to estimate their potential [20]. The main results show that financial losses will be moderate between 0.1% and 4.1%, depending on which climate Flanders will evolve to the future. If agriculture adapts itself to this climate change the losses will drop from 0% to 0.4%. Summer drought in particular will have an adverse impact on crops with superficial rooting like beetroot.

As an answer on climate change the above study and other information served as the basis for a brochure about adaptation. The brochure is called: "Goed geboerd ? Ook het klimaat is u dankbaar ! and it is available online [41]. The brochure is a part of a total educational programme set up in the Flemish agricultural sector with a seminar on Agriflanders, Seminars for farmers organised by governmental advisors and an article in "Boer en tuinder", the regional agricultural magazine.

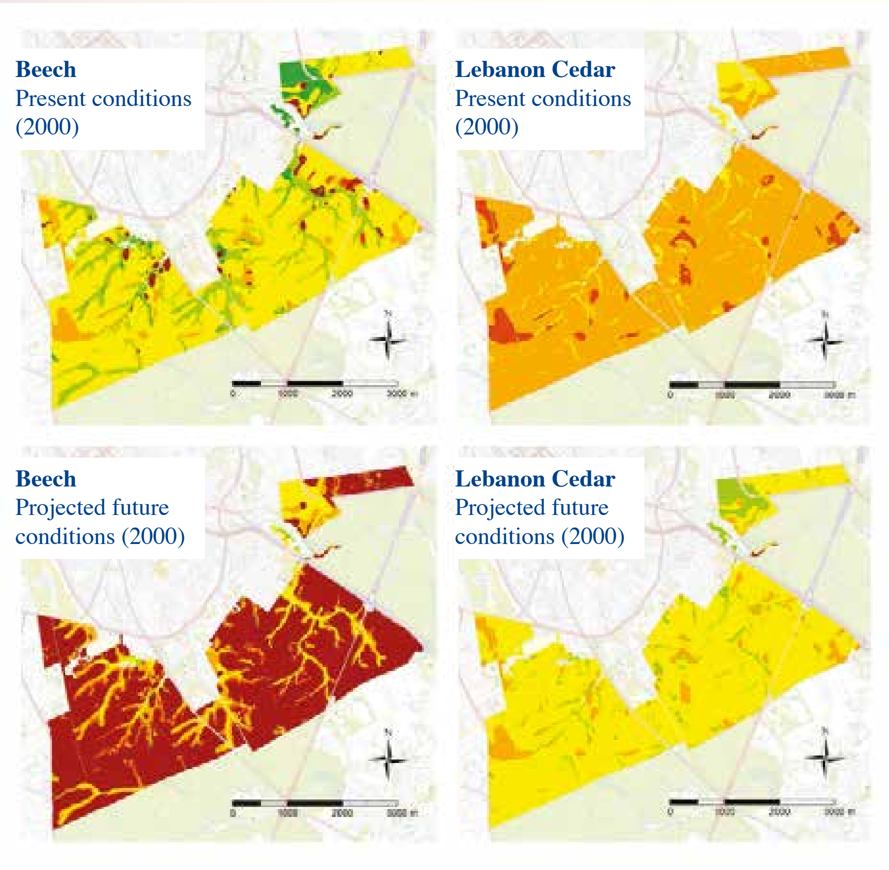
A recent study in the framework of the AMICE [11] project showed that adaptation measures taken in the Meuse basin (e.g. changing the sowing and harvest dates) can attenuate the impacts of climate change by almost 50% (Bauwens et al., 2012) [4].

Another recent good initiative set up is the GISER [21] unit, Technical experts and scientists work together with cities, agricultural associations and farmers to prevent and solve erosion, streaming and mudflow problems. GISER's missions are to improve knowledge on erosive phenomena, provide technical recommendations, share experiences and inform about integrated management methods for the soil – erosion – streaming.

Luckily the dynamics of the agriculture is still faster than the dynamics of the climate change. So with some good policies, few losses will be caused by the changing climate.

The research programme for earth observation "STEREO II" (2006 - 2013) funded by the Belgian Federal Government and managed by the Federal Science

Figure 6.8 Potentiality maps based on the adequacy of the growing conditions for 2 tree species (left: Beech; right: Lebanon Cedar) for the present conditions (2000) and the projected future conditions (2100)



Optimal conditions
One limiting factor appears but tree species can tolerate it
Strong exclusion

Source: ULg-GxABT, 2009.

Policy Office (BELSPO) aims to develop an autonomous Belgian Earth observation expertise. Under STEREO II, the research project "Earth Observation to support Agricultural Damages Assessment System in Crop Insurance Schemes" (ADASCIS) aims to develop a user-defined information system for agricultural damage and risk assessment based on remote sensing and agrometeorological modelling to help manage the Disaster Fund. In the broader context of farm insurance, the system could be used by the Flemish and Walloon authorities, farmer organisations and the insurance sector to develop agricultural insurance products.

Within the research programme "Science for a Sustainable Development" managed by the Federal Science Policy Office (BELSPO), one research project under the research domain 'risks' (2012-2016) relates to meteorological risks as drivers of environmental innovation in agro-ecosystem management.

The research hypothesis is that meteorological risks act as drivers of environmental innovation in agro-ecosystem management. The major objectives of the proposed project are to characterise extreme meteorological events, assess the impact on Belgian agro-ecosystems, characterise their vulnerability and resilience to these events, and explore innovative adaptation options to agricultural risk management.

6.3.5. Forests

6.3.5.1. Impacts and vulnerabilities

In 2009, Belgian forests covered nearly 7000 square kilometer or 23% of national territory [22]. The majority of these forests (almost 80%) are in the Walloon Region. Deciduous and coniferous species are well balanced and covered each almost 50% of the area.

To anticipate the effects of climate change on Belgian forest ecosystems, various scientific studies have been launched in the course of the past decade [7]. The results show that increasing CO_2 concentration in the atmosphere will accelerate forest growth. However, in the medium-term, this growth will be limited by soil fertility and by the relative drought caused by higher temperatures and precipitation changes. These results were confirmed by the regional vulnerability assessment in 2011 [2].

Some conifers, the spruce for example, will become increasingly less suited to the climate because of milder, rainy winters. In time, a broad-leaved tree such as beech could also become ill suited to the climate due to periods of drought. This does not necessarily mean that existing trees would disappear, but the species would no longer represent the natural vegetation (which is not always the case at present, moreover). It is obvious that forests will undergo changes, at times significant, in species composition. Figure 6.8 taken from a study on the Forêt de Soignes/Zoniënwoud (the “green lung of Brussels”) and shows this change of growing conditions which could be at the origin of the beech disappearing but also of the arrival of other species.

6.3.5.2. Adaptation measures

The new Forest Code[51] (approved on 15 July 2008 by the Walloon Parliament) advocates a mixed-species, mixed-age forest, adapted to climate change and able to mitigate certain effects. Forestry practices must therefore try to favour the species best adapted to (present-day) local conditions, which constitutes a first step towards adaptation to future changes.

Species diversification and conservation of ecosystems that have remained relatively unaltered by human activity also enhance the forests’ capacity to adapt to changes [6]. Among the measures outlined within the new Forest Code are the retention of dead or fallen trees, the retention of at least one tree of biological interest per 2-hectare area and the introduction of integrated forest reserves in broad-leaved stands. Moreover, in order to improve the resilience of the forest ecosystem, we should encourage complex forest structures, ensure that soil fertility is maintained, manage water resources optimally (enhance soil and groundwater recharge by maintaining good soil structure and limiting the water consumption of the ecosystem through our choice of species and forestry practices), monitoring the density of game populations and correcting imbalances by means of amendments to situations requiring a response. Such provisions also apply in the Brussels-Capital Region.

In the Walloon region, a group of experts is studying the impacts of climate change in forest ecosystems. This group has produced a document containing recommendations for policy makers and a good practice guide for forest managers [8]. As stated above, the spruce a tree widespread in Wallonia is highly vulnerable according to the climatic projections. Consequently, a new norm has been approved in 2009 to adapt the forestry practices of this species related to global changes (including climate change).

The Walloon Observatory of Forest Health was inaugurated in April 2011. This observatory was set up to assess and monitor the health of the forest throughout the territory, at both the short and long terms. It has 4 missions: 1) to produce a periodic assessment of the health of the forests, 2) to maintain data up to date regarding the development of diseases and pathogens, 3) to participate in the elaboration of maps of biotic and abiotic risks based on the vulnerability of the forest species and the stations, and 4) to compile the knowledge needed to set up a coordinated struggle in case of sanitary crisis. Partnerships have been set up with the Brussels Region and France to facilitate the exchange of data in real time when diseases appear and to allow a concerted management at interregional scale.

In Brussels Region, the Forêt de Soignes/Zoniënwoud is particularly vulnerable to climate change, considering that its main varieties (beech tree and summer oak) are particularly sensitive to droughts. The prospects for their preservation are not optimistic. The forest is a particularly interesting case due to its proximity to a large city that generates specific disturbances (intensity of atmospheric pollution, density of human visitors, etc.). The evolution of its beech trees and oaks is monitored thanks to a permanent inventory of their condition. The first inventory revealed signs that the forest was dying. The Region will adopt the forest management plan to preserve or improve its regenerative capacity and adaptation to environmental change.

In the framework of the research programme “Science for a Sustainable Development - SSD” managed by the Federal Science Policy Office (BELSPO), the research project ECORISK “A decision support tool to manage climate change risks to forest ecosystems” (2012-2016) aims to generate a decision support tool to analyse risks to forest ecosystems and forest responses as a result of extreme climate events, with a focus on addressing long-term effects on water, carbon and nutrient cycling in Belgian forest ecosystems. By extension, the tool will be able to simulate the enhanced dispersion of certain elements (radionuclides and trace metals) at the biosphere/geosphere interface, through the coupling of element fluxes to the above-mentioned water, carbon and nutrient fluxes. In all, this type of study has an obvious potential for linking climate (extreme droughts) with forest growth (biomass) and element cycling (heavy metal contaminated ground water and sites, nuclear waste disposal) for a better evaluation of environmental solutions.

6.3.6. Fisheries

6.3.6.1. Impacts and vulnerabilities

Various commercial fish stocks that are currently being fished by the Flemish fleet are undergoing changes in density and distribution. These changes are also expected to continue in future.

There is no clear explanation for the change in frequency of heavy storms for the areas that are fished by Belgian vessels.

The marine fishing sector is an important activity for the coastal community from a social economic and cultural perspective.

Due to its specialised fishing method and target species, this sector is vulnerable to increases in fuel prices, fluctuating fish prices and numerous national and European regulations, among other factors. In addition to this, it must also deal with the variations and consequences of climate change that are far

[51] Decree of 15 July 2008 relating to the Forest Code (Belgian Official Journal of 12.09.2008), amended by a Walloon Government Decree of 12 December 2008 relating to the date of effect of Article 6 of the Decree of 15 July 2008 concerning the Forest Code and the operations of the Conseil Supérieur Wallon des Forêts et de la Filière Bois (Walloon Higher Council for Forestry and Timber Industry) (Belgian Official Journal of. 13.01.2009), [23]

from easy to estimate. However, fishing can also be adversely affected by new species that appear because of climate change. Jellyfish constitute a significant danger in this regard. The invasiveness of the comb jelly M. Leidyi in the North Sea in the 80s has led to a major change in the marine ecosystem and economic losses due to a decline in fish and shellfish stocks [54]. The MEMO European Interreg funded project lead by ILVO, working together with 5 other international scientific research institutes has as goal:

- Development of standard procedures for identification, monitoring and modeling of potential habitat and population dynamics of M. leidyi.
- Study of the physiology, eating behavior and potential predators of the species through experiments and mathematical models.
- Evaluation of the potential environmental and socio-economic costs of the impact of the species by an ecosystem-based approach.

Another project Jellyfor is more general on Jellyfishes and is aimed at setting up jellyfish forecasting based on in situ and remote sensing data [55].

6.3.6.2. Adaptation measures

6.3.6.2.1. Sustainable fishing

An optimal fleet is sufficiently flexible and robust to adequately respond to fluctuating circumstances, including climate change, and has no further imbalance between fishing capacity and fishing opportunities. In addition to economic and social considerations, the design of this fleet must be based on an ecosystem approach, in which living aquatic resources are sustainably managed within ecological limits. This means that the entire ecosystem, and not just the isolated element that is economically important, must be considered. The starting point in this regard is long-term management plans based on the best available scientific advice, including the effects of anticipated climatological changes. This approach aims to minimise both the direct and indirect effects of fishing on the future functioning, diversity and integrity of the ecosystems in question.

In order to be sufficiently robust, this fleet – and the individual vessel owners in particular – would have to be able to respond quickly within a clear statutory framework to fluctuating circumstances and be able to work out a healthy short and medium-term operational strategy. Individual vessel owners and/or segments of the fleet would, for instance, have to be able to follow commercially exploited fish stocks and to move on a seasonal basis to other fishing grounds in order to maintain or even increase catch levels. Opportunities in this regard are still limited by statutory rules and practical feasibility. Vessel owners would also have to be able to decide to invest in other fishing methods in order to change their target species. This decision is based on investment costs, target species, operational expenses and available expertise. Diversification of the fleet could help to enhance the quality of life within and flexibility of the Belgian fishing sector and improve the cost structure of individual vessel owners.

Simplifying and adapting current regulations are important steps in the transitional process.

6.3.6.2.2. Improving on-board safety

Poor weather conditions can hinder work on board a fishing vessel and increase the risk to both the crew and the vessel. The potential risk is determined not only by wind speed, but also by wind direction, the type of vessel and the applied fishing method. Although it is not yet possible to unambiguously forecast the change in intensity and frequency of storms for the areas in which the Belgian fleet is active, increasing safety is something that concerns the entire fishing sector.

6.3.7. Infrastructures

6.3.7.1. Impacts and vulnerabilities

The key threats from the climate for infrastructures and urban environments are the encroaching urban heat islands, heat waves, flood risks and also potential water shortages.

6.3.7.2. Adaptation measures

The adaptation policy in this area calls for improvements to the existing infrastructures, so that they can withstand the impact of climate change or to mitigate the adverse effects. The policy also involves construction of new infrastructures capable of dealing with the effects of climate change and development of an urban planning policy which takes these vulnerabilities into account.

Adaptation of buildings is essential to deal with climate change, in order to ensure the thermal comfort of their occupiers limited energy consumption. In a high energy performance building thermal comfort is provided through natural heating and cooling. In this case, the environment and climate are key considerations in the construction process and the maximum benefit is derived from solar radiation, the thermal inertia of building materials and the ground, as well as natural air circulation.

The Interreg IVB-project "Future Cities – urban networks to face climate change" tries to adapt city structures to the inevitable climate change. As cities are particularly vulnerable to climate change (for example heat waves) combined measures such as energy savings, greening and bringing water in the cities are possible answers to reduce their vulnerability. The city of Ieper in cooperation with the West-Vlaamse Intercommunale (WVI) are involved as partners in this project. A task for the project partners is to develop an ambition note and a master plan, realizing green and blue elements in the project, and to communicate and promote the project.

With regard to urban planning structures, the CcASPAR project has been put in place to highlight the spatial challenges of tackling climate change and to provide planning adaptation policy recommendations. The results are published in the book *"Klimaat in Vlaanderen als ruimtelijke uitdaging, I don't believe in global warming"* [Climate in Flanders as a spatial challenge: I don't believe in global warming] [59].

Each of the Belgian entities has already adopted measures for adapting the infrastructures and urban environment to climate change. Those adopted to deal with the increased risk of flooding are set out above (see chapter 1, point 3 Vulnerability assessment and climate change measures), a. Water management, Floods). The measures adopted to deal with urban heat islands and average rise in temperatures include:

- constructing high energy performance buildings by imposing a carbon-neutral standard for new structures (housing, offices and schools) from 2015 or 2019 (depending on the region concerned), and by setting objectives through a series of measures aimed at bolstering the sustainable construction market, notably by promoting high energy performance and environmentally friendly buildings;
- imposing a requirement for an energy certificate to be issued when existing buildings are sold or let in order to provide the potential buyer or tenant with the energy performance and consumption levels;
- imposing measures to combat the consequences of soil sealing (e.g. in the Brussels Region, the obligation to create green roofs for all flat roofs that are not accessible and have a surface area of more than 100 m², as well as maintaining 50% permeability in the case of new builds; in Wallonia, a study and mapping of soil sealing are underway). Imposing de-sealing measures through the Rainfall Plan;
- stepping up re-vegetation in urban environments;
- funding of sustainable urban development projects, with climate-change adaptations forming a key part of the selection criteria;
- funding of sustainable urban projects (see the "Ecopolis" project which takes climate change into account and forms part of the government funded DuLoMi programme fostering local sustainable environment management projects [56], [57]).

One initiative to be mentioned is the *"Gents klimaatverbond"* [Ghent Climate Alliance] platform. This group encourages the town of Ghent to make greater allowance for climate change. Ghent is currently the pioneer in this area. It is a member of the "EU Cities Adapt" project.

6.3.8. Transport

6.3.8.1. Impacts and vulnerabilities

Climate change is likely to have serious consequences in the field of transport. The main vulnerabilities relate to road, rail, inland waterway and air transport infrastructures. They also concern mobility and will undoubtedly affect the modal split. For example, the train is likely to become an increasingly attractive option due to its resilience and because active modes of transport will become increasingly unattractive.

6.3.8.1.1. Vulnerabilities linked to periods of freezing and snowfall

Periods of freezing and snowfall have the potential to disrupt the (road and public) transport networks and cause damage to infrastructures.

A significant fall in the number of days of freezing is projected under all models and across all horizons. Globally, changes in freeze/thaw cycles (warmer winters) could therefore have positive impacts for infrastructures, particularly in terms of lower maintenance costs over the winter since fewer repairs would be needed for potholes/deformation caused by freezing. Less disruption in terms of traffic is also to be expected: less likelihood of rails being blocked by ice, for instance.

The number of days per year of snowfall and the number of days that snow remains on the ground declined steeply in the course of the 20th century and will continue to fall during the 21st century. In the short term (at least until 2030), however, the intensity of snowfall may increase and therefore result in disruptions of transport networks.

6.3.8.1.2. Vulnerabilities linked to increased drought in the summer

The principal effect of rising temperatures and, more specifically, temperature extremes would be much greater use of individual air conditioning to provide thermal comfort in (individual and public) means of transport, thereby jeopardising the principle of reducing green-house gas emissions.

With public transport, there may be problems with electronic vehicle systems and electricity substations if temperatures rise too high. An increase in operating costs might also be possible. Secondly, transport may be disrupted if the energy network becomes overstretched (e.g. if public transport is not given priority). Rail transport is a major consumer of electricity; trains are, indeed, driven by electricity. Thirdly, rail transport might be affected by high temperatures in another way: increased dilation and deformation of the rails themselves.

With regard to road infrastructures, high temperatures should have less impact than freezing (weakening of the road surface, formation of ruts, for example) and high rainfall (management and removal of runoff). A degree of anticipation is needed, however, particularly since they are likely to have consequences for rolling stock, notably as concerns tyres.

6.3.8.1.3. Vulnerabilities linked to rainfall

Inland waterways will also suffer from the effects of climate change in the event of extreme weather conditions. The projected decrease in rainfall in the summer, the increased evaporation due to the higher temperatures projected over the same period together with the potential drop in supply from water courses, will mean problems with draught levels and an increased risk of low water flows, particularly based on the "driest" models. Likewise, the lower water flow would be exacerbated by the increased sedimentation that could be caused by heavy rainfall over the summer. The increase in sedimentation could lead to an increase in drainage operations. In this regard, a link can be made with mitigation policy: from the point of view of reducing greenhouse gases, inland waterway transport is to be favoured. It is therefore essential to anticipate the effects of climate change to prevent, or at least minimise, future problems.

6.3.8.2. Adaptation measures

A "bad weather" plan (also referred to as a "Snowfall" Plan) was adopted in the Brussels-Capital Region and Wallonia in 2011 by public transport managers (the TEC - Transport En Commun – Group and the *STIB/MIVB – Brussels Intercommunal Transport Company*) to deal with these vulnerabilities and ensure that the overground transport network functions well in the event of freezing, snow and other bad weather. It covers simple organisational matters (such as having sufficient salt available) and identifies several alert levels and consequent actions to be taken. The aim is to keep travellers informed about deviations and disruptions of the network in the event of climate events.

With regard to railways, the rail infrastructure manager (Infrabel) has summer and winter plans designed to anticipate and limit rail disruption as far possible. Infrabel is also taking part in the ARISCC (Adaptation of Railway Infrastructure to Climate Change) project, focusing on integrated management of the natural risks arising from climate change (floods, storms, landslides, subsidence, avalanches, etc.) with the aim of maintaining and improving the performance of the rail infrastructure. The Belgian national railway company, the SNCB/NMBS, has specific meteorological models for predicting the adhesion traction index, freezing of the third rail and the icing of overhead lines to enable it to respond to specific transport needs. It also has disaster plans to deal with flooding of the lines or the landslide of railway embankments. Exceptional predictive models are also available to provide accurate predictions for specific routes (notably based on temperature, high winds and rainfall) for any rail network in the world.

A draft ***Marine Spatial Plan for the North Sea*** recommends the creation of islands of sand along the Belgian coast, notably to help protect the coast from waves and enable vessels to sail in a fluvio-maritime area.

6.3.9. Industry and services

6.3.9.1. Impacts and vulnerabilites

The business sector will also have to deal with climate change, both directly through the influence of the production process (e.g. water shortages) or the impact of the weather (floods, wind damage, excessively hot or cold days, etc.), and indirectly through problems with provisioning and shortages.

For industry, many adaptation measures will be related to energy issues. One specific problem that will probably occur is the effect of temperature increase (i.e. problems to cool energy plants and other industry).

Financial institutions are making progress in estimating the risk of climate change in order to avoid losses.

Geert Noels's 2008 book *'Econoshock Hoe zes economische schokken uw leven fundamenteel zullen veranderen'* (Econoshock - how six economic shocks will fundamentally change your life) can already give some insight into the dangers that can arise from an economist's perspective. [58]

6.3.9.2. Adaptation measures

The search is on within the *'Nieuw Industrieel Beleid'* (New Industrial Policy) for a new approach or other processes that can bring about a better future for Flemish industry. This includes looking for clever specialisations that would give Flanders a competitive edge within Europe. There is also a focus on making markets more flexible and consequently less vulnerable to change. Climate change is part of this because industries will be positively or negatively influenced by it. The influence of climate change on determining where to locate industrial estates mainly consists of the risk of flooding and the availability and cost of water for cooling or other processes.

The climate response that is shaped within the MilieuEffectRapportage (Environmental Impact Report) will also influence location considerations. Climate change can also be addressed within factories themselves with new technological developments in the construction/renovation of factory buildings, particularly in relation to heating and cooling.

Water consumption is already being reduced through initiatives such as grey water recycling and encouraging the limited use of water with the ecology premium. VITO and VLAKWA, two research organisations, are working together with the business sector to investigate innovative opportunities for closed loop recycling, in which advanced technologies are used to purify wastewater to the extent that it is given a second economic life, for instance as cooling water or cleaning water.

New insurance instruments will have to be developed in order to better protect customers and financially empower them against the greater risk of damage due to climate change.

At federal level, coverage against flooding and other natural hazards has been included in household fire insurance policies since 2007 (see paragraph on 'floods').

At the same time, but separately from climate change, changes in socio-economic circumstances will also lead to an increased risk of damage (greater prosperity, world-wide population growth, population concentrations in more vulnerable areas along coasts and rivers). It will be a challenge to estimate the size of climate change's share in the total growth of the risk.

6.3.10. Energy

6.3.10.1. Impacts and vulnerabilities

Energy production, transport and consumption are affected by the climate and will have to adapt to the climate change anticipated.

With regard to **consumption**, small differences in temperatures or rainfall have a major impact on consumer energy consumption. Global warming will increase the need for cooling over the summer and reduce the need for heating over the winter (overall, annual energy consumption should fall). Since cooling is dependent almost exclusively on electricity, these changes in demand will have a direct impact on demand for electricity.

With regard to **production**, both conventional and renewable systems will be affected by climate change.

In the event of prolonged periods of drought, water for cooling electric power stations will become increasingly scarce, posing greater risks of temporary closure.

The offer of renewable energy, dependent on the wind, sun, water flow, and the growth of biomass, will be affected by climate change.

With regard to **infrastructures**, the network will be sensitive to extreme events and to high levels of heat (wind turbines, power lines, etc.).

Increased flooding could affect power stations and substations.

A particular challenge for the energy sector, which is responsible for the majority of anthropogenic greenhouse gas emissions (EEA, 2012), is to put in place synergies between adaptation and mitigation.

6.3.10.2. Climate-change adaptation measures

Sustainable energy production methods not requiring water-based cooling are promoted in Belgium [24].

Various measures have been taken at federal and regional level to promote building insulation (tax cut from 2007 to 2011 for carbon-neutral housing combining major cuts in energy consumption and greater thermal inertia; a tax reduction since 2002 for expenditure on roof insulation; regional regulations on the energy performance of buildings) (also see chapter 4.3).

Numerous initiatives, not related to adaptation to climate change, are aimed at securing the supply of energy to Belgium. Predictive studies are being conducted at federal level to assess the likelihood of shortfalls and draw up plans for managing them. These studies allow for the overall changes in energy demand anticipated, such as the growing need for cooling in the summer.

The Flemish Region is planning to conduct an analysis of the vulnerability of installations sensitive to (temporary) reductions in the availability of water; it will be based on an analysis of river sensitivity. This would make it possible to identify the measures required (e.g. the installation of reservoirs) to make the sector less dependent on the availability of water.

6.3.11. Tourism

6.3.11.1. Impacts and vulnerabilities

Tourism depends strongly on the weather and climate, although other factors, trends and changing consumer preferences also play a role in the attractiveness of a destination.

It is expected that climate change will have rather positive effects on the Belgian tourism sector. The tourism season may become longer, with an increase in the number of pleasant and therefore attractive days for tourists. In southern Europe, the summer period in particular may become unbearably hot, making regions to the north a more attractive summer holiday destination for tourists. The summer peak in southern Europe will probably decrease and the best periods for holidays could move to spring and autumn.

The growth in the number of overnight stays in Flanders due to climate change is expected to fluctuate between +2% and +16%. By comparison, depending on the scenario, this is likely to be between -1% and -4% in southern Europe. An increase in the number of overnight stays will obviously result in greater tourist spending.

However, climate change will also have a number of negative consequences, such as more damage to infrastructure or accommodation due to the increasing intensity of rainfall. This could have very negative consequences, particularly in case of damage to large tourist attractions or unique cultural heritage sites.

Tourism entrepreneurs will possibly also have to invest more in cooling systems and use more water, which may have an effect on the profitability of their businesses.

Climate change will lead to higher doses of harmful UV radiation. It therefore seems appropriate to provide for a sufficiently varied range of tourism and recreational activities.

Out of all destinations, the coast will feel the greatest impact of climate change. The warmer climate will attract more tourists. However, these additional tourists will further increase the mobility problem that already exists on peak days. The increase in sea level will also reduce beach areas and additional beach fills will be necessary to ensure protection. Measures are already being taken to maintain or even increase beach areas.

The rise in sea level and an increasing number of winter storms will cause greater damage to tourism infrastructure and particularly to marinas. It is nevertheless expected that adopting protective measures will help to keep this damage limited.

The changing climate will also create new activities. The change in water temperature will ensure a greater presence of marine mammals (seals, whales and dolphins). These types of animals attract tourists and can give rise to activities aimed at viewing them in their natural environment.

City tourism will be less influenced by climate change than at the coast. Pleasant weather is appreciated but is not an absolute condition when choosing a city trip destination.

Tourism in other regions will be less influenced than at the coast. Holidays in these regions mainly involve activities such as cycling and walking. Although these are weather-sensitive activities, they mainly involve the domestic market and so competitive relationships will not change under the influence of climate change. Spring and autumn remain the best periods for this type of holiday.

In southern Belgium, tourism offer is more linked to rural and forest environment and also to rivers. In the summer, dryer weather could have an adverse impact on nautical activities such as kayaking (and to a lesser extent diving) if the water level is too low in the rivers. During softer and wetter winters, the snow level is foreseen to evolve. There is a large degree of uncertainty and, it is very difficult to say how it will evolve. We can still say that if temperature conditions are concomitant with heavy rains episodes (expected in the projections), this will lead to heavy snowfalls. On the opposite side, the temperature increase expected in winter can either quickly melt the snow fallen or prevent its formation. In any case winter tourism will be affected by these changes and it is important to anticipate this issue, in terms of security, infrastructure and housing.

6.3.11.2. Adaptation measures

Climate change creates specific opportunities for the tourism sector. Although both the government and the sector itself can take action to respond to these opportunities, it is still too early to make large-scale shifts in the focus of tourism policy.

It is important to respond to the opportunities offered by the intervention of other policy areas (urban renewal, renovation of a dyke, etc.). The government must cooperate in this so that these areas are organised in such a way that tourists will want to visit them.

By giving Tourism Flanders ("Toerisme Vlaanderen") the opportunity to contribute towards major projects, it became involved in the layout of Sigma areas and sits on water basin management boards in order to be able to respond to opportunities as they arise. The protection of tourism infrastructure (such as the coast or cultural heritage) in turn forms part of the broader framework of coastal defences or public safety. A cooperation agreement has been concluded between Tourism Flanders and the Maritime Services and Coast Agency (MDK), which deals, among other things, with the organisation of coastal defence projects. It has also been agreed that Tourism Flanders will take MDK's coastal weather forecast into account in promoting the coast.

Regarding infrastructure and housing, as climate change will have impacts on the Belgian touristic offer, it is important to anticipate and organise a reflection to maximize the future opportunities. That is one of the objectives of a study presently conducted in Wallonia: "Impact de la modification climatique à 30 ans sur le tourisme en Wallonie" (Impact of climate change in thirty years on tourism in Wallonia) [25]. This study was launched in January 2012 for a period of 3 years to find answers to the questions "How will climate change modify the spatial distribution and frequentation of recreational areas?", "What is the impact of climate change (and mitigation policy) on the European touristic flows to and from Wallonia?".

6.3.12. Health

6.3.12.1. Impacts and vulnerabilities

Climate change will affect human health both directly and indirectly (forced migration, increased time spent outside, etc.):

Heat waves — victims in heat waves

European research into the number of heat waves during summer 2003 indicates an increase in the number of deaths from June to September of that year in 12 European countries. The extreme temperatures also aggravated exposure to other harmful substances, such as ground-level (or tropospheric) ozone and particulate matter. People are exposed to heat stress particularly in cities as a result of climate change.

Belgium has had four summers with extended heat waves since 1990 [61]:

- In summer 1994, a six-week heat wave[52] claimed 1 226 lives. In addition to the high temperatures, increased ozone concentrations also resulted in victims;
- In 2003, Belgium had a significant heat wave that lasted for 14 days, and another hot period that lasted for 13 days. These periods claimed the lives of 1 230 victims. If one looks at the entire summer (June to September) of 2003, the death toll rises even further to 2 052. The ozone concentrations were also exceptionally high;

[52] A heat wave in Belgium is defined as a period of at least five days in which the maximum daily temperature in Ukkel is at least 25°C (summer days), and in which the temperature moreover exceeds 30°C (tropical days) for three days.

- There were two heat waves in 2006, of 5 and 21 days respectively, and another hot period of 9 days. These three periods collectively resulted in 1 263 deaths. Almost half of the victims were 85 or older;
- There were two heat waves in quick succession at the end of June and in the first half of July 2010. The first heat wave lasted for 12 days and resulted in 593 deaths. The second heat wave lasted for eight days and caused 374 victims. Mortalities in both periods were significantly higher than the reference level: +20% and +19% respectively. More than 40% of the victims were 85 or older.

There were no extended hot periods in 2007, 2008 and 2009 and significant deaths were therefore not recorded in the summer months of those years. Temperatures were also mostly moderate in the summer of 2011. The deaths of 238 victims were recorded at the end of June during a few successive days with maximum temperatures in excess of 25°C. Most of the victims were older than 65.

Belgian was confronted with a heat wave every one to two years on average in the 20th century. However, there has been an annual heat wave on average since the nineties [60, 61].

Research is still needed to assess the importance of high ozone concentrations connected to heat waves. Nevertheless it is clear that heat waves apose a significant risks for health, such as exhaustion due to sweating wich leads to water and salt deficiencies and heat strokes caused by a loss of temperature control in the body a severe and potentially lethal condition. The most vulnerable groups are babies and young children, elderly people and top class athletes [27].

Higher mean temperature — It is expected that higher temperatures will reduce the prevalence of some winter diseases (e.g. cardiovascular diseases), although no detailed studies on this issue are available for Belgium. According to one study published in the British magazine Nature Climate Change, over the past decades the rise in average temperatures and ambient humidity during the hottest months has led to a 10% reduction in work capacity for activities exposed to thermal stress. From now until 2050 this work capacity may drop by 20% overall, with people employed in agriculture, construction and the military being the most exposed. [68]

Europe could face an increase in the outbreak of diseases such as botulism caused by warm anaerobic water and vector-borne diseases. Vector-borne diseases are transmitted by arthropods such as ticks (e.g. tick-borne encephalitis (TBE), Lyme disease), mosquitoes (e.g. Chikungunya fever, Dengue fever, malaria, Rift Valley fever), or sand flies (e.g. visceral leishmaniasis). Climatic changes, such as hotter and longer summers, warmer winters, and/or increased annual rainfalls could enable these cold-blooded organisms to shift their habitats, potentially introducing diseases to places where they have not been seen before or reintroducing them to places where they had already been.

Rising temperatures could also lead to increased risk of temperature-sensitive infectious diseases such as food-borne infections, increased seasonality and duration of allergic disorders.

6.3.12.2. Climate-change adaptation measures

Policy on adaptation in the field of health calls for a range of measures to be adopted, including:

- adaptation of built structures to ensure the thermal comfort of buildings and their occupants (thermal insulation, shutters to protect against the sun, ventilation, etc.). Initial regulations to further facilitate this were established in the framework of implementation of the EU Directive on the energy performance of buildings. All the Belgian regions have established regulations and/or subsidies specifically aimed at reducing the risk of overheating in new houses;
- maintaining an effective health system and adopting measures aimed at providing better care for the vulnerable and disadvantaged (high-performance home care services to combat isolation, emergency hospital admission, access to care, access to wildlife havens, such as green spaces, forests, etc.);
- adaptation of infrastructures (transport, provision of water fountains in public spaces);
- changes to the pace of life during heat waves (changes to the opening hours of public and private-sector establishments);
- identification and monitoring of new health risks associated with climate change;
- eradication of new vectors for diseases;
- and even the need to maintain and promote awareness (schools, the general public, caterers) and communication campaigns (targeting vulnerable populations).

To combat heat waves and the associated risks throughout Belgian territory, the Federal Government, with the cooperation of the regions and communities, has drawn up a “Heat wave and ozone-peaks plan” [29] as part of the National Environmental Health Action Plan (NEHAP).

This plan involves a series of phased-in measures and communication initiatives in addition to actions targeting the reduction of ozone formation. The first phase takes place every summer and focuses mainly on preparatory actions and dissemination of public information, and calls for the support of people at risk. The pre-alert phase begins when the mean minimum and maximum temperatures, over a period of two consecutive days, exceed a threshold corresponding to the 95th percentile of summer temperatures. The alert phase is declared when the Royal Institute of Mete-

Table 6.1 Summary of the consequences of climate change, adaptation measures and vulnerabilities

Sector		Vulnerabilities	Adaptation measures reported
Water management		Increased evaporation in the summer, potential rainfall reduction making a lower groundwater level likely. Water availability in the north of the country is already limited. Reduced water flow in summer could also have an impact on the quality of surface waters. Problems with water for cooling electricity power stations (reduced cooling capacity and problems with availability in drier periods). Increased rainfall in winter, contributing to greater groundwater recharge. Variations in flow could result in heavier pollution of surface waters.	Widespread information campaign to encourage water savings. Flood prevention framework (regional plans). Measures aimed at improving the surface and quality of groundwater (e.g. nitrates). Inclusion of cover for floods (and other natural disasters) in household fire insurance policies. Technical specifications for construction linked to water courses that allow for an increase in temperature of 2°C. A microclimate study will begin shortly on the impact of climate change on management of the water resources for the Brussels-Capital Region.
Coastal areas		Rise in sea level, increase in storms, greater wave height close to the coast. Increase in the salinity of groundwater along the coast and in port areas, putting pressure on fresh water reserves (the polders marshland).	Coastal safety master plan. Coastal defence allowing for the coast's natural dynamic.
Biodiversity	land	Changes to the species ranges. Spread of pests and invasive species. Reduction (if not disappearance) of the ranges of certain species. Changes to the life cycle of certain species. Disruption of interactions between species. Appearance of new species, but also of new pests and diseases.	Network of protected areas (Natura 2000). Bioclimatic classification of species. Combating habitat fragmentation. Combating invasive species (prevention, detection and eradication). Measures favouring biodiversity in towns. Monitoring the effects of climate change on biodiversity. Agri-environmental measures. Species diversification.
	marine	Rise in water temperature leading to a change in the distribution of organisms. Change in seasonal cycles and the structure of marine food webs. Proliferation of potentially harmful species of algae. Increase in the vulnerability of commercial species. Increase in the acidity of surface waters affecting numerous organisms. Consequences for commercial fishing.	Marine Spatial Plan for the North Sea in the process of being drawn up. Monitoring and protection of maritime species and habitats.
Agriculture		Positive impact on yields limited in time due to a lack of soil fertility, water and photoperiod. Potential development of new diseases and pests. Damage caused by extreme climatic events.	Agri-environmental measures. Programme for sustainable nitrogen management in agriculture (Wallonia). Inventory of opportunities for adaptation in agriculture (and horticulture) and information campaign (brochure entitled *"Goed geboerd? Ook het klimaat is u dankbaar!* [Done your bit? And the climate is in your debt too!], seminars, articles, etc.) in the Flemish Region. Creation of a research and technical information centre for soil erosion in the Walloon Region.

Sector	Vulnerabilities	Adaptation measures reported
Forests	Acceleration of forest growth, limited in the medium term by the (fall in) soil fertility and relative drought caused by higher temperatures and changes to rainfall in the summer. In the longer term, certain species will no longer be adapted to the climate (spruces, beech trees).	Allowance made for climate change in the Walloon Forest Code (also included in the Brussels plan for managing the Forêt de Soignes/Zoniënwoud woodland area). Diversification of species and conservation of ecosystems that are relatively unaffected by human activities. Establishment in the Walloon Region of the forest health observatory and a group of experts responsible for studying the impact of climate change on forest ecosystems. This group has drawn up recommendations for policy makers and a good practice guide for forest managers. Partnerships in place with the Brussels Region and France to facilitate the exchange of information in real time on diseases for the purposes of concerted management at interregional level. Permanent inventory of the health of the Forêt de Soignes/ Zoniënwoud woodland area (monitoring changes in oak and beech trees).
Fishing	Change in the abundance and distribution of commercial fish stocks. Major vulnerability of the sector due to its specialisation (fishing methods and target species). Risk of a decline in stocks due to the appearance of new species (e.g. jellyfish).	MEMO interregional project. Measures required: simplification and adaptation of the current legislation and regulations, increased safety on board ship.
Infrastructures	Infrastructures	Adoption of climate change adaptation measures for infrastructures and the urban environment (imposition of the carbon-neutral standard for new buildings, combating the consequences of soil seal, increased revegetation in the urban environment, etc.). The IVB interregional project, “Future Cities – urban networks to face climate change”, aimed at adapting urban structures to the likely effects of climate change. The CcASPAR project, aimed at pinpointing the spatial challenges of climate change and coming up with policy recommendations for adjustments to town and country planning.

Sector	Vulnerabilities	Adaptation measures reported
Transport	Fewer freeze and thaw episodes that potentially disrupt the (road and public) transport network and cause infrastructure damage and traffic problems. In the short term, however, the increase in snowfall could exacerbate and cause disruptions in the transport networks. The rise in temperatures would result in greater recourse to individual air conditioning for the thermal comfort of passengers (on individual and public transport). On public transport, temperatures that are too high could cause problems for the electronic vehicle systems, as well as for electricity substations and water depth. If there is an increase in the demand for energy (in summer): risks of public transport disruption. The rail network risks being affected by high temperatures: Increase in dilation and deformation of road infrastructures, impacts linked to the effects of high temperatures (softening of the road surface, formation of ruts, for example) should be less than those arising from freezing. However, there is the potential for impacts associated with higher rainfall (management and removal of runoff). The risk for inland navigation of low water flows.	A «bad weather» plan (also referred to as a «Snowfall» Plan) adopted by public transport managers (the *TEC - Transport En Commun – Group and the STIB – Société des Transports Intercommunaux de Bruxelles)*. The North Sea Disaster Prevention and Management plan (to combat exceptionally high tides). Summer" and "winter" plans drawn up by the rail infrastructure manager to anticipate and limit rail disruption as far as possible. ARISCC (Adaptation of Railway infrastructure to Climate Change) project. Development of specific models for predicting the rail adhesion index, the freezing of the third rail and the icing of overhead lines to be able to respond to specific transport needs.
Industry & services	Impact on production processes (e.g. water shortages, cooling of plant, etc.) and direct damage (flooding, high winds, etc.). Indirect impact (supply problems).	Through the "new industrial policy", research into a new approach/other procedures for Flemish industry. Allowance for the effects of future climate change in environmental impact surveys.
Energy	Small differences in temperature and rainfall result in major changes in consumer demand for energy (increase in summer, fall in winter). Reduced availability of water for cooling electricity power stations in summer (risk of temporary closure), the network will be sensitive to extreme events and to high temperatures (wind turbines, power lines, etc.). Increased flooding could affect electricity power stations and substations.	Promotion of sustainable energy generation methods not dependent on the availability of water resources. Promotion of building insulation. Measures aimed at securing the supply of energy: predictive studies to assess the risk of shortfalls and draw up plans to manage any shortfalls. Future measure: analysis of the vulnerability of installations sensitive to (temporary) reductions in the availability of water; to be based on an analysis of river sensitivity.

Sector	Vulnerabilities	Adaptation measures reported
Tourism	Potential positive impacts (particularly on the coast), despite (limited) damage to tourist infrastructures. Climate change could also make it possible to diversify the range of tourist offering. Water sports (such as kayaking) could be adversely affected by dryer summers. Impact on winter tourism.	Involvement of "Toerisme Vlaanderen" in the Sigma plan to control flooding zones. Cooperation agreement between that tourism body and the Maritime Services and Coast Agency (MDK), responsible, *inter alia*, for managing coastal defences. Opening of a study on the "Impact of climate change on tourism in Wallonia in 30 years' time".
Health	Heat waves: rise in mortality, disease and ozone peaks. Temperature rise: potential reduction in the prevalence of certain winter diseases (cardio-vascular diseases), reduction in capacity for work during hotter months, risk of an increase in the appearance of diseases such as botulism and vectoral diseases (Lyme disease, the Chikungunya virus and dengue fever).	A heat wave and ozone peaks plan forming part of the National Environmental Health Action Plan (NEHAP). The MODIRISK programme to draw up an inventory of endemic and exotic mosquito species in Belgium. This programme led to the eradication of the *Aedes japonicas* mosquito. Pilot project to monitor exotic mosquitoes in Belgium.

orology forecasts a heat wave of three days or more, or when the Interregional Environment Unit forecasts ozone concentrations above the EU information threshold. Warnings are then sent to emergency rooms and geriatric departments of hospitals, rest homes, etc. A survey on the application of concrete measures in these organizations is being conducted. This monitoring is one of the elements the authorities have taken into account when they decide whether it is necessary to move into the crisis phase, which implies the creation of a crisis unit and additional measures. Since 2007, the working group has widened its scope to include air pollution episodes.

The MODIRISK programme was launched in 2007 to draw up an inventory of endemic and exotic mosquito species in Belgium. This programme was funded through the Belgian scientific policy (BELSPO) and coordinated by the Tropical Medicine Institute in Antwerp, with the cooperation of the Catholic University of Louvain-la-Neuve, the University of Wageningen (the Netherlands), the Belgian Royal Institute of Natural Sciences and the consultancy firm AVIA-GIS (Agriculture and Veterinary Information and Analysis).

The programme came to an end in March 2011. The project confirmed the presence of two types of exotic mosquito species in Belgium, one of which, the *Aedes japonicas* (the Asian bush mosquito) is a potential vector for tropical diseases, such as the West Nile virus and other types of viral encephalitis.

To deal with this problem quickly, the Federal Department for Public Health, Food Chain Safety and the Environment cofinanced the eradication of the Aedes japonicas mosquito.

In the wake of this project, the Interministerial Conference on the Environment took the decision on 30 March 2012 to finance a pilot project to monitor exotic mosquitoes in Belgium. This pilot project forms part of an initiative launched by the European Centre for Disease Prevention and Control (ECDC). A “mosquitoes and health” group was set up in June 2012 to work on the “human health” aspect of the “monitoring” plan: monitoring and control.

6.4. Coopération on adaptation

6.4.1. Development cooperation

Belgian development cooperation has explicitly included the fight against climate change as a priority in its policy since 2008. This is because the consequences of climate change on countries in the South is a significant source of instability in terms of food safety, degradation of biodiversity, migration, public health and tensions that sometimes even spill over into conflicts. These countries are the first victims of climate change because they bear less responsibility for its consequences and have fewer resources in their fight against it. The new Belgian Development Cooperation Act, published on 19 March 2013, includes the protection of the environment and natural resources, as well as the fight against climate change, as one of two important transversal priorities. Failing to take the possible impact of climate change into consideration could further partially or fully cancel out all the efforts to combat poverty and the achievement of the Millennium Development Goals.

In order to facilitate the integration of this priority, the KLIMOS research platform [62], a consortium of several Belgian universities with a network of universities in the South, developed an Environment Sustainability Toolkit. Various initiatives for capacity building within Belgian development cooperation were organised. Two specific regional workshops on adaptation and development, one in West Africa and one in East Africa, were organised in 2011. Various Belgian cooperation field agencies and representatives of the bilateral partner governments were invited.

A brief overview of Belgian development cooperation with a number of impressive examples of how climate adaptation and, in the broader sense, the fight against climate change are integrated into the various programmes and projects follows below. Further details of financial resources are discussed further in this national communication.

6.4.1.1. Bilaterale cooperation

The priority sectors of Belgian bilateral cooperation, in which the impact of climate change must be taken into account, are laid down by law: agriculture, infrastructure, education & training and healthcare.

In Uganda, Belgium supports a programme for the improvement of the value chain in the agricultural sector via delegated cooperation with Denmark. Climate change is specifically included as a risk to be taken into account in the implementation of this programme.

In Burundi, Belgium lends support to institutions such as ISABU *(Institut des Sciences Agronomiques du Burundi)*. This support to ISABU is in line with Belgian strategy to no longer provide public services itself, but to strengthen Burundi government institutions. The main aim of this project is to boost agricultural production, both quantitatively and qualitatively. It is moreover in keeping with the needs that are formulated in the Burundi Plan d'Action National d'*Adaptation aux Changements Climatiques* (PANA) [63].

6.4.1.2. Indirect cooperation

By means of its support to non-government organisations in the North and South and to scientific institutions, Belgian contributes towards several programmes and projects that have adaptation to climate change as one of their angles of approach. Support to the Red Cross for capacity building programmes in the prevention of natural disasters in Burkina Faso, Burundi, DR Congo and Rwanda is one example in this regard.

6.4.1.3. Multilateral cooperation

Belgium supports 20 multilateral partner organisations, mainly via contributions to public funds. One example is cooperation with the United Nations Environment Programme (UNEP) that has included the fight against climate change as one of six strategic priorities in successive work programmes.

Also worthy of mention is Belgian support to the Global Environment Facility, not only in terms of its compulsory contributions to the general fund, but undoubtedly also its contributions to the GEF climate funds. As part of the Copenhagen Accord, Belgium contributed a significant part of the available resources for fast-start financing to the fund for the least developed countries of the GEF, which focuses specifically on climate adaptation.

6.4.1.4. Awareness

Belgian development cooperation contributes towards greater public awareness of climate-related problems by means of publications and other awareness activities.

6.4.2. International scientific research

Belgium supports international agricultural research, inter alia by means of the Consultative Group on International Agricultural Research (CGIAR). This group supports 15 research centres whose purpose, on the basis of scientific findings, is to ensure improved food safety, improved human nutrition and health, a higher income for the poor and improved management of natural resources. New crop varieties, knowledge and other research products are made available to individuals and organisations throughout the world that work in sustainable agricultural development. Around one-third of the research programmes fall under the scope of the fight against climate change and its impact. Centres such as IITA, CIAT, ICRISAT, ICARDA and WARDA carry out research into modified agricultural crops. The World Agroforestry Centre, ICRISAT, ICARDA and IITA research adapted agricultural techniques and identify innovations at institutional and policy level for better agricultural management in response to climate change. The aspect of capacity building is obviously an important motivation for Belgian support to a research environment such as CGIAR. Belgium is also collaborating with different partners at European level. Especially on the impacts, vulnerability and adaptation assessment, Belgian institutions are represented in different European research networks (e.g. CIRCLE and CIRCLE-2, JPI). Belgian universities participate in European research projects (e.g. EU Cities Adapt, SIC-ADAPT!, AMICE, Future Cities, TIDE, SUDEMCLL, BLAST, SAFECOAST, Ourcoast, ClimateCost, Espace, Climate proof Areas). ■

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7. Financial resources and technology transfer

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7.1. Legislative and institutional framework od development cooperation policies and programmes

The Law of 25 May 1999 on international cooperation remained the reference for Belgium's development cooperation policy during the reporting period. The most important goal is sustainable human development, to be achieved by combating poverty on the basis of partnership and in compliance with the criteria of relevance to development, as defined by the Development Assistance Committee of the Organisation for Economic Cooperation and Development (OECD-DAC). The law introduced the principle of geographical and sectoral concentration of aid. Environmental protection was one of the transversal themes. The new law on development cooperation came into force on 19 March 2013. It includes explicit provisions relating to the transversal integration of the protection of the environment and natural resources, combating climate change, drought and global deforestation into Belgian development cooperation.

In implementation of the Federal Government coalition agreement of 2003, Belgium's direct bilateral ODA targets 18 countries, 13 of which are located in Africa. Nine of these countries belong to the group of Least Developed Countries (LDCs). The following sectors are given priority: basic health care, education and training, agriculture and food security and basic infrastructure. Conflict prevention and social development was previously another priority, but human rights, decent work and social development are included in the new law as priorities to be incorporated in all action.

In November 2008 and December 2011, the Minister for Development Cooperation confirmed in policy memoranda that Belgium would fully support the goals of the international community to realise the Millennium Development Goals (MDGs), with a catch-up action for Africa and special attention to fragile states. One of the priorities is the fight against climate change, with a focus on adaptation to climate change of the LDCs.

The Belgian parliament monitors cooperation policy via the assessment reports from the Special Evaluation Office (an external agency) and parliamentary questions, and helps to shape policy through its legislative function. Following institutional reforms, development cooperation was incorporated into the Federal Public Service Foreign Affairs, Foreign Trade and Development Cooperation (FPS FA) as the Directorate General for Development Cooperation and Humanitarian Aid (DGDC). Development cooperation has primarily been the responsibility of the Federal Government to date.

However, the principle of transferring certain aspects of development cooperation to the federated entities (Regions and Communities), on the basis of responsibilities allocated to these entities internally, is embodied in the special Law of 13 July 2001 transferring various competencies to the federated entities, and was confirmed in a government statement of July 2003. This process is still under way. The priorities remain the development of synergy between federal and federated entities, which can carry out development cooperation activities based on their own competencies, as well as overall policy consistency.

Moreover, the bodies involved in indirect cooperation, particularly non-governmental organisations (NGOs), scientific institutions and universities, also play an important role in terms of specific types of development, supplying information to the public, capacity-building and raising awareness. They too receive substantial support from the DGDC.

Lastly, Belgium invests in the private sector in emerging countries through the Belgian Investment Company for Developing Countries (BIO), hence contributing to social and economic growth in emerging and developing countries.

Table 7.1 Belgian Official Development Assistance

Belgian ODA 2010-2012 (in EUR)	2009	2010	2011	2012
Directorate General for Development Cooperation and Humanitarian Aid (DGDC)				
Governmental cooperation	291 535 404	346 710 188	291 975 722	269 462 000
Non-governmental cooperation	233 032 467	228 076 839	238 332 216	228 942 000
Multilateral cooperation	444 719 636	462 125 381	503 061 536	413 878 730
Belgian fund for food security	31 443 107	16 541 329	21 252 869	22 760 000
Social development	27 112 570	35 201 208	48 908 085	14 412 000
Humanitarian and food aid	56 057 930	97 983 370	106 913 322	69 183 000
Aid to the private sector, BIO	142 351 398	118 322 746	120 438 248	5 918 000
Interest subsidies	18 517 825			
Awareness campaigns in Belgium (excl. NGOs)	5 494 561	9 869 520	7 370 453	5 917 000
Administration, evaluation, other	1 505 431	2 738 165	2 205 623	1 714 000
Total DGDC	**1 251 770 330**	**1 317 568 746**	**1 340 458 074**	**1 032 186 730**
TOTAL FA (excl. DGDC)	**97 439 093**	**97 712 075**	**109 858 394**	**99 744 110**
Other official sources				
FPS Finance – Administration expenses	1 077 324	1 119 485	1 026 612	1 018 916
FPS Finance – Repayment of state loans	-31 606 530	-28 146 513	-22 554 313	-24 305 262
FPS Finance – HIPC debt relief			2 168 924	
FPS Finance – Multilateral and other	401 926	829 957	17 670	
Belgian aid via Eur. Comm. (excl. EDF)	288 900 000	265 405 078	265 092 000	256 657 162
Debt relief via Delcredere Office	74 750 000	416 535 000	95 570 000	211 620 000
Other Federal Government Departments	41 625 021	40 081 808	41 569 900	
ODA share of FEDASIL expenditure	66 318 445	71 822 303	91 094 577	
Flemish Region and Community	49 544 245	48 081 307	54 037 368	51 471 000
Walloon Region / French Community	23 452 050	26 060 990	28 690 481	
Other local governments	10 122 381	11 970 905	11 406 045	
TOTAL OTHER OFFICIAL SOURCES	**524 587 861**	**853 760 321**	**568 119 263**	
TOTAL BELGIAN ODA	**1 873 797 285 0.55% GNI**	**2 269 041 142 0.64% GNI**	**2 018 435 732 0.53% GNI**	**Est 1 800 000 000**

7.2. Belgian Official Development Assistance

The table 7.1 gives a summary of overall ODA in the period 2009-2012. The figures in the "other official sources" section for 2012 are estimates because the final figures were not available at the time of the analysis.

As well as the DGDC, which administers the majority of Belgian development assistance, the Federal Public Service Finance also plays a key role, managing country-to-country loans and contributions to international organisations. In addition to DGDC, other directorates-general of the FPS Foreign Affairs play an important role (managing contributions to international institutions and action on conflict prevention and emergency aid) and a variable share of debt relief is managed by the National Delcredere Office (Belgian's leading overseas export credit insurer) each year. Measures are also taken by the regions and communities, the provinces and a large number of municipalities (about 5% of ODA).

Belgium uses the Rio markers to report to the OECD-DAC about the official development assistance that has been spent on activities to support the goals of the United Nations treaties on biodiversity, climate adaptation and mitigation and desertification (respectively UNCBD, UNFCCC and UNCCD). These are policy markers that provide a gauge of policy objectives but do not make it possible to quantify financial flows.

For the sixth communication to UNFCCC, the data for the calculation of expenditure concerning climate change were obtained from the ODA databank of DGDC. A sectoral analysis was conducted, in which the following sectors were evaluated in their entirety: environmental protection, water supply and sewage, agriculture and stock farming, forestry, energy and fishing/aquaculture. The same calculation method was used for the fifth national communication, which makes it possible to ascertain trends between the different reporting periods.

Other sectors were partially included: humanitarian aid (sub sectors: coordination, prevention and reconstruction), industry (sub sectors: administration, research, agricultural industry, forestry industry), transport (transportation by water) and multisectoral (sub sectors: general, alternative development, research, urban development, education and rural development). A weighting factor was applied to each sub sector to estimate the contribution to the fight against climate change.

For each sub sector, it was also arbitrarily assumed that the projects within these sectors all aimed to achieve increased adaptation to climate change or increased mitigation of climate change. In addition, the subdivision was selected as bilateral (between Belgium or Communities/Regions and the partner country), indirect (NGOs, universities, research institutions, etc.) and multilateral.

Table 7.3 is a combined table of the aforementioned sectors, listing the total amount per sector (complete or partial), the estimated adaptation and mitigation components and the total climate-related part per sector (from 2009 to 2012). The figures for 2012 do not include all data for the contributions from the communities and regions, but their share in the total ODA is rather limited. These figures are given for each sector examined in table 7.3. The report also gives details of the climate-related expenditure for each executive group (governmental, indirect[53] and multilateral). The tables showing climate-related expenditure for each country, sector and year are included in the tables 7.9 to 7.12.

[53] Indirect cooperation entails the cooperation through non-governmental organisations, scientific institutions and universities and via BIO, the Belgian Investment Company for Developing Countries.

Table 7.2 Climate-related ODA - Summary

Summary (in EUR)	2009	2010	2011	2012
Adaptation	46 580 798	65 775 345	69 683 424	43 476 874
Mitigation	32 450 553	45 966 100	44 453 700	23 009 164
Total climate-related	79 031 351	111 741 445	114 137 124	66 486 038
Total ODA for selected sectors	416 405 569	430 284 282	449 239 320	293 317 140
% climate-related ODA	19	26	25	23

The share of climate-related ODA in the selected sectors has increased significantly since 2010, and subsequently levelled off at roughly 25% of the total ODA expenditure in these sectors. During this period, and in spite of a difficult budgetary situation, Belgium has made efforts to contribute to the fast-start finance as agreed at the UNFCCC COPs in Copenhagen and Cancun (see boxed text). Additional resources were made available for the fast-start finance in 2010, 2011 and 2012, over and above the budgeted measures.

Table 7.3 Climate-related ODA 2009-2012 for selected sectors

Climate-related ODA (Expenditure in EUR)	2009		2010		2011		2012	
	adaptation	mitigation	adaptation	mitigation	adaptation	mitigation	adaptation	mitigation
Energy	3 717 774	16 930 214	2 638 776	22 614 530	3 227 161	26 106 653	1 883 404	8 409 714
Forestry	786 421	362 387	10 516 560	643 523	271 403	501 551	389 194	247 422
Agriculture	11 611 220	3 196 127	11 455 361	2 885 889	13 414 592	3 493 033	9 714 018	3 876 649
Fishing	218 558		287 101		286 730		228 806	
Water supply and sanitation	6 149 832	7 741 466	6 001 175	16 924 818	6 468 415	11 076 923	2 863 361	7 649 521
Industry	344 974	137 052	362 309	6 847	355 804	97 576	27 319	
Environment	11 348 005	951 275	19 827 021	1 028 645	31 315 323	770 392	19 834 389	549 956
Multisectoral	5 087 523	3 132 032	4 304 845	1 861 848	4 893 596	2 407 573	3 066 357	2 275 902
Humanitarian aid	7 166 492		10 282 199		9 270 402		5 370 027	
Transport	150 000		100 000		180 000		100 000	
Total	**46 580 798**	**32 450 553**	**65 775 345**	**45 966 100**	**69 683 424**	**44 453 700**	**43 476 874**	**23 009 164**

Belgian contribution to fast-start finance pursuant to the Copenhagen Accord and the Cancun Agreements

1. Federal government

In the period 2010-2012, the federal government contributed 78 million EUR to fast-start finance for adaptation and mitigation in the developing countries as part of Belgium's commitments following the UNFCCC COPs in Copenhagen and Cancun.

The projected budget for funding of climate-change measures within the DGDC budget was increased in 2010, 2011 and 2012 specifically to facilitate this contribution.

25 million EUR of this amount was allocated to the GEF Least Developed Countries Fund (LDCF), which specifically addresses adaptation in the LDCs. The LDCF is responsible for funding the implementation of the National Adaptation Programmes of Action in these countries. All of Belgium's partner countries in this group of fragile countries submitted a National Adaptation Programme of Action (NAPA) and most of them now have a number of projects under way or in the start-up phase.

A contribution of 19 million EUR, earmarked for Technology Transfer, was made to the GEF Special Climate Change Fund (SCCF). This programme includes a mitigation component, ranging from demonstration projects for low carbon technology through application and distribution of energy-efficient technologies, renewable energy and urban transport to sustainable land use and adaptations in land use and forest management. Within the adaptation sub-programme, the categories are the demonstration of adaptation technologies, mitigation of the vulnerability to the impact of climate change and increasing the capacity to adapt to climate change.

In 2010, the contribution to the BIO (Belgian Investment Company for Developing Countries), which supports aid to the private sector in developing countries, included an amount of 20 million EUR earmarked for investment in renewable energy, with a particular focus on Africa and the LDCs.

In addition, in 2010 the DGDC increased its contribution to the GEF 5th Replenishment, under fast-start finance, by 10 million EUR – for the Sustainable Forest Management component. The developing countries may use these resources for sustainable forestry management programmes, LULUCF and REDD+.

Lastly, in 2010 and 2011 six projects were financed for a total of some 4.1 million EUR for disaster prevention as part of protection against natural disasters in Mali, Cuba, the Dominican Republic, the Great Lakes area, the Andes region and the Caribbean. The executive partners were the Red Cross, Oxfam, FAO and UNDP.

2. Flemish Region

The Flemish government earmarked 5 million EUR to contribute to the Belgian commitment, in the form of aid to multilateral and non-governmental partners: UNEP, ICRAF, the Red Cross, UNDP, UNIDO, UNESCO and ANTEA Group. The projects focus on humanitarian aid and disaster prevention, forestry and agriculture and water management. The project beneficiaries live in the Flemish Region's partner countries - Malawi, Mozambique and southern Africa, and in Uganda, the Latin American and Caribbean regions, the Comoros, Zambia and Kenya. Please consult the 2012 annual report of the Flemish Region Development Cooperation for more specific information.

3. Walloon Region

The objective of the Fast-Start Wallonie programme is to support action to mitigate greenhouse gas emissions in the Walloon Region's partner countries and adaptations to counter the negative impact of climate change. The partner countries are: Benin, Burkina Faso, Burundi, Senegal, DRC, Rwanda and Haiti.

The programme operates through project calls in the partner countries (bilateral approach), and two project calls have been made since 2010. 18 projects were selected under these two calls and almost 5 million EUR raised to fund them. These projects encompass domestic energy (more efficient ovens and production of efficient charcoal), waste, water, agriculture (e.g. micro-irrigation), reforestation and rehabilitation of degraded land.

7.3. Financial contributions to multilateral institutions and programmes

From 2009, Belgium resolutely opted for a rationalisation of the cooperation with multilateral organisations, in line with the Declaration of Paris and the principles of "Good multilateral donorship". In this context, Belgium will aim for maximum core funding of its multilateral partners from 2009 onwards and will limit earmarked contributions to programmes conducted by a multilateral partner organisation at a regional or country level at the request of the partner country.

Via the multilateral budget the DGDC finances a number of environment-related programmes that deal with climate change, biodiversity and actions to combat desertification (Rio Conventions). The main contributions to multilateral institutions and programmes are summarised below (see table 7.4).

Table 7.4 Contributions to multilateral institutions and programmes

Institution or programme	Contribution (in EUR)			
	2009	2010	2011	2012
World Bank	139 450 000	124 100 368	145 931 100	156 181 082
African Development Bank (ODA)	26 443 873	26 723 713	62 639 953	5 028 405
European Development Fund	129 360 000	148 485 000	115 117 476	94 453 973
European Investment Bank	6 062 581	9 408 405	7 846 735	10 982 207
Asian Development Bank	19 791 381	1 865 221	1 594 318	1 856 170
West African Development Bank	2 864 000	2 864 000	3 863 658	-
United Nations Development Programme	35 793 272	41 569 750	47 688 140	28 082 727
United Nations Environment Programme	4 289 723	3 335 121	3 828 718	40 652
UNFCCC	169 243	99 891	160 176	49 939
UNCBD	42 005	64 379	82 811	40 652
UNCCD	79 910	81 815	81 488	77 054
Food and Agricultural Organisation	14 684 510	21 150 683	27 262 925	13 544 477
International Fund for Agricultural Development	11 539 533	12 251 911	9 833 974	12 011 793
CGIAR (Global Consortium for International Agricultural Research)	8 682 463	8 961 965	9 101 173	8 378 884

GEF

The Global Environment Facility (GEF) was established in 1994 as an independent financial mechanism to make grants and soft loans to cover the costs of measures aimed at protecting the global environment and promoting sustainable development. This occurs via six Focal Areas: climate change, biodiversity, international waters, desertification, protection of the ozone layer and Persistent Organic Pollutants.

Financial resources for the GEF are replenished every four years. The 5th Replenishment is currently under way. The negotiations for the 5th Replenishment of the GEF's resources (GEF 5) ended in May 2010, resulting in a significant increase in the total resources. This was necessary as a result of various recent international agreements. The GEF serves as the central funding mechanism for implementing the objectives of different major environmental conventions: the Convention on Climate Change, the Convention on Biological Diversity, the Convention to Combat Desertification and the Stockholm Convention on Persistent Organic Pollutants.

Belgium promised a contribution of 78 million EUR for the GEF's 5th Replenishment. The Belgian contribution to the GEF, which is managed entirely by the DGDC, is shown in the table 7.5.

For the period 2012-2013, Belgium is a council member for its countries group, which is comprised of Belgium, Austria, Luxembourg, Hungary, Slovakia, Slovenia, the Czech Republic and Turkey. In this capacity, the DGDC participates in meetings of the Management Council. Belgium was also a council member in 2009, and in the intervening period it participated in meetings as an advisory member in the countries group.

For more information on the contribution to the LDCF and SCCF as part of Belgian fast-start finance: see boxed text.

UNEP

Belgium's financial commitment to the UN Environment Programme for 2009-2012 amounted to 11.5 million EUR. UNEP's mission is establishing international standards for environmental policy and steering international action based on scientific knowledge.

Table 7.5 Contributions to the GEF (in EUR) in the period 2009-2012

Contributions to the GEF (expenditure in EUR)	2009	2010	2011	2012
Global Environment Facility Trust Fund (obligatory contribution)	23 090 000	17 000 000	17 000 000	17 000 000
GLOBAL ENVIRONMENT FACILITY - Sustainable Forest Management (voluntary contribution - fast-start)	-	10 000 000	-	-
Voluntary Contribution to the GEF - Special Climate Change Fund (SCCF - Technology Transfer – fast-start)	-	-	10 000 000	9 000 000
Voluntary Contribution to the GEF- Least Developed Countries Fund (LDCF - adaptation to climate change – fast-start)	440 000	10 000 000	10 000 000	5 000 000
Total contribution	**23 530 000**	**37 000 000**	**37 000 000**	**31 000 000**

More specifically, UNEP's work encompasses:

- monitoring and assessing global, national and regional environmental conditions and trends
- developing national and international environmental instruments
- strengthening national institutions for the wise management of the environment
- facilitating the transfer of scientific knowledge and technology relating to the environment as part of sustainable development
- encouraging partnerships and new initiatives in the public, NGO and private sectors in order to make the authorities aware of the most urgent environmental problems.

UNEP's strategy for the period 2010-2013, which reflects the programme's vision and mission, focuses on six priority themes:

1. Climate Change
2. Disasters and Conflicts
3. Ecosystem Management
4. Environmental Governance
5. Harmful Substances and Hazardous Waste
6. Resource Efficiency – sustainable production and consumption

From 2009, the DGDC contributions to UNEP will be solely in the form of core contributions for the general budget of the organisation and no longer for specific programmes and projects. This core financing is aimed at increasing the efficiency of the multilateral organisations and enhancing the predictability of the assistance. UNEP is also one of the ten executive agencies of the GEF.

World Bank

The World Bank Group is a major partner of Belgian development cooperation, given the volume of Belgium's obligatory contribution, which amounted to more than 148 million EUR in 2012.

Belgium also works closely with the World Bank on a voluntary basis by financing projects that are in line with the priorities of Belgium's development policy and the comparative advantages of the WB through a range of trust funds managed by the WB. A strategic cooperation framework was first established for these **voluntary contributions** in early March 2008, setting out the principles of the DGDC cooperation with the WB and IMF for a period of four years. Via this strategic framework, Belgium wished to make the WB's knowledge and expertise available to its partner countries, more especially those in sub-Saharan Africa and the group of low-income countries. This strategic cooperation agreement was drawn up in March 2008 and applied for the period 2008-2011. The agreement facilitated the funding of multilateral programmes in the following three specific areas, with a focus on capacity-building: (i) support for poverty reduction strategies (ii) enhancing macro-economic management, in terms of fiscal and monetary policy and debt reduction policy, and (iii) fostering good governance and combating corruption.

One feature worthy of note as regards management of natural resources is the *Extractive Industries Technical Advisory Facility* (EI-TAF): the aim of the EITAF, which was set up by the WB in 2009, is to support resource-rich developing countries in management of their natural resources and in the tendering and negotiation processes on licencing and development with companies in the mining and extractive industries. First and foremost, the technical support entails assisting with policy, capacity-building and the preparation of tenders and negotiations through studies, technical analyses, policy-setting, etc. The facility also supports global knowledge management regarding best practices in the administration and economic management of the extractive industries and mining sector. EI-TAF therefore comprises two components: (1) technical assistance via rapid response advisory services that can be mobilised quickly and efficiently (in principle within two months) at the request of a partner country, and (2) production and distribution of documentation on management in the extractive industries. In principle, the donors finance the technical assistance and the WB provides funds for documentation. A one-off contribution of 1 million EUR was made to EITAF in 2012.

European Development Aid

The Cotonou Agreement is a master agreement between the EU and the ACP (African, Caribbean and Pacific) countries, based on political dialogue, trade and development cooperation. The Agreement was signed on 23 June 2000 in Cotonou and applies for twenty years, but may be revised every five years (Article 95, para. 3). This revision of the Agreement makes it possible to adapt the EU-ACT partnership to changes in requirements, the actual situation, the international context and the EU's commitments on development cooperation. It was revised for the first time in 2005, and was amended again in 2010. The amended Agreement was signed in Ouagadougou on 22 June 2010. The European Development Fund is the basic financial instrument for cooperation between the EU and the ACP countries. It has several components, including non-refundable aid, venture capital and private-sector loans. The first financial protocol under the Cotonou Agreement was the ninth European Development Fund (EDF) for the period 2000-2007, in a total amount of 13.5 billion EUR. Moreover, the outstanding amount of previous EDFs amounted to more than 9.9 billion EUR.

The tenth European Development Fund that runs from 2008-2013 has a budget envelope of 22 682 billion EUR.

The **UCP-EU Energy Facility** is part of the European response to the issue of access to sustainable energy services. A first Energy Facility was launched in 2005, following funding of 220 million EUR drawn from the 9th EDF. On the back of the success of this initiative, the EU set up a second Energy Facility with a budget of 200 million EUR for the period 2009-2013. It is funded from the 10th EDF. The first call for proposals, for a total of 100 million EUR, was launched on 30 November 2009.

A further contribution of 200 million EUR was made to the **Water Facility** for the period 2010-2013. The specific goals of the Water Facility are: 1) to contribute to the achievement of the targets of the Millennium Development Goal No. 7 (MDG 7), in particular access to safe drinking water and basic sanitation and 2) to contribute significantly to improving water governance and management of water resources and to the sustainable development and maintenance of water infrastructure (including technical, environmental and economic viability).

The Belgian contributions to the EDF and to the European Investment Bank are listed in table 7.7.

Multilateral Fund of the Montreal Protocol

Although ozone-depleting substances (ODS) make up a fair share of the greenhouse effect, the direct results of financial contributions to the Multilateral Fund of the Montreal Protocol on the mitigation of climate change are difficult to assess. Yet payments to the Montreal Protocol Multilateral Fund may be indicative of a country's commitment to international cooperation on sustainable development.

The Belgian Federal Government's contributions to Multilateral Fund of the Montreal Protocol amounted to some 4.9 million EUR in the period 2009-2012.

Other programmes

To a certain extent, other programmes not directly focused on climate change have benefits in terms of mitigation or adaptation: certain actions of the multilateral programme of the Food and Agriculture Organisation (FAO), International Fund for Agricultural Development (IFAD) and various UN agencies and programmes. Since 2009, Belgium has only contributed by means of core contributions to its multilateral partner organisations. Contributions to some of these organisations (FAO, IFAD, UNDP, UNEP) are shown in table 7.4. A specific campaign may also be launched in collaboration with a partner organisation at the request of the partner country. Information on these activities is given in the section on bilateral cooperation.

Among the actions under the framework of the Consultative Group on International Agricultural Research (CGIAR), some are directly related to sustainable agriculture (see also chapter 6) and are aimed at adaptation to climate change. These include actions by the International Centre for Research in Agroforestry (ICRAF) on the interaction and symbiosis between forestry and agriculture, and also the activities of the IITA (International Institute for Tropical Agriculture - Nigeria) and CIAT (International Centre for Tropical Agriculture – Colombia) concerning the adaptation of crops to changing conditions. Worthy of particular mention is the climate-specific CGIAR research programme "CCAFS – Climate Change, Agriculture and Food Security". In addition, Bioversity International is active in the field of biodiversity and climate and ICARDA (International Centre for Agricultural Research in the Dry Areas) focuses particularly on agriculture in dry and semi-arid regions, where adaptation and mitigation are of vital importance, and also the CIP (International Potato Centre), which focuses on potatoes and tubers, often in relation to adapted plants and improved cultivation methods.

It is also worth mentioning that Belgium supports the International Banana Gene Bank (an international body located at KU Leuven), where research includes the drought resistance of bananas.

Belgium contributes more than 9 million EUR every year to the CGIAR, chiefly through non-specific contributions.

Table 7.6 Summary of climate-related ODA in multilateral cooperation

Multilateral cooperation (expenditure in EUR)	2009	2009 climate-related	2010	2010 climate-related	2011	2011 climate-related	2012	2012 climate-related
Energy	19 185 866	3 717 773	14 026 722	3 405 344	18 417 246	4 283 449	10 370 559	2 674 112
Forestry	272 861	90 044	10 165 009	10 054 453	57 067	18 832	-	-
Agriculture	43 233 887	6 440 171	43 503 072	6 467 887	54 984 562	8 718 228	34 148 207	4 828 791
Fishing	1 665 812	-	2 384 743	-	2 266 069	-	1 705 239	-
Water supply and sanitation	18 917 941	4 729 668	17 915 278	4 480 986	20 147 002	5 038 298	7 831 250	1 990 910
Industry	10 493 833	334 452	6 542 202	322 933	5 284 018	335 535	776 488	-
Environment	32 773 470	11 030 495	40 042 312	19 803 005	52 953 648	30 734 519	29 220 195	18 884 905
Multisectoral	33 611 155	2 182 074	30 033 200	1 720 188	39 302 494	2 330 026	25 862 495	1 759 668
Humanitarian aid	16 811 971	5 040 591	21 243 336	6 373 001	27 398 548	8 219 565	12 759 440	3 827 832
Transport	3 000 000	100 000	2 000 000	100 000	3 600 000	180 000	2 000 000	100 000
Total	**179 966 796**	**33 665 268**	**187 855 872**	**52 729 807**	**224 410 655**	**59 858 452**	**124 673 873**	**34 066 218**

7.4. Belgian bilateral ODA

7.4.1. Federal Government

Belgian bilateral ODA is delivered through two channels. There is the direct bilateral cooperation (or governmental cooperation), which is made up of the different forms of aid managed at federal level or by regions/communities. There is also the indirect bilateral cooperation, which consists of the programmes co-financed by the DGDC, but prepared and implemented by so-called indirect players, mainly recognised NGOs, Belgian universities and scientific institutions and associations specialised in training human resources in the developing countries, and BIO (the Belgian Investment Company for Developing Countries).

The Belgian Fund for Food Security (BFFS) - the successor to the Belgian Survival Fund – was founded in 2009 (law of 19 January 2010). Even more than its predecessor, the BFFS aims to ensure that all **dimensions** of food security are included as far as possible in its programmes: availability, access, stability and consumption. The BFFS is an initiative of the federal parliament and has a budget of 250 million EUR for the period 2010-2022. The Fund's strategy was set out in the implementing order of 19 June 2011. The explicit transversal themes set are gender and the environment, more specifically combating climate change. When preparing a country programme that is financed by the Fund, and when identifying the area in which intervention will occur, climate change is always included as one of the factors for determining vulnerability to food security.

There are also special programmes relating to humanitarian aid and conflict prevention. Indirect cooperation increased steadily in the past and has varied between 228 million EUR and 338 million EUR since 2009. The geographical concentration of bilateral cooperation is increasing significantly: the focus in on sub-Saharan Africa, and the three main recipients of bilateral aid (DR Congo, Rwanda and Burundi) accounted for an average 34% of total governmental DGDC aid in 2012. This figure demonstrates that LDCs and Central Africa are given clear priority.

The total ODA for the period 2009-2012 granted via direct and indirect cooperation was approximately 2.2 billion EUR.

Table 7.7 Belgian bilateral ODA (direct governmental cooperation) for the sectors of forestry, agriculture, fishing, water, energy, environmental protection, humanitarian aid, industry, transport and integrated development (multisectoral)

Governmental cooperation (expenditure in EUR)	2009	2009 climate-related t	2010	2010 climate-related	2011	2011 climate-related	2012	2012 climate-related
Energy	23 194 749	15 911 765	11 130 739	8 757 220	21 659 017	17 032 684	10 417 040	7 542 868
Forestry	2 398 822	791 714	1 807 732	600 417	1 737 495	573 373	1 750 128	577 542
Agriculture	21 776 083	2 904 423	27 310 024	3 260 570	31 749 478	2 883 727	36 719 609	3 699 773
Fishing	728 054	145 611	876 962	175 392	948 698	189 740	801 591	160 318
Water supply and sanitation	24 997 449	7 365 429	55 678 566	16 469 750	37 056 734	10 946 043	21 916 444	6 356 134
Industry	1 814 081	47 433	2 644 468	30 096	1 628 863	16 685	1 392 863	-
Environment	2 841 853	594 606	751 805	182 081	1 711 594	703 451	2 770 800	872 819
Multisectoral	28 391 082	2 905 245	25 469 222	2 216 397	24 386 634	2 003 322	12 085 660	1 163 625
Humanitarian aid	1 600 644	480 193	5 000 000	1 500 000	331 768	99 530	3 276	983
Transport	-		-		-		-	
Total	**107 742 817**	**31 146 420**	**130 669 519**	**33 191 924**	**121 210 280**	**34 448 555**	**87 857 411**	**20 374 063**

The policy of the successive Ministers for Development Cooperation in the period under review always focused on better incorporating climate change in all actions supported by the DGDC. The priority is Africa and the LDCs. An increasing number of cooperation programmes with the partner countries include a specific component geared to combating climate change (including in Uganda, Vietnam, Mozambique and Burundi), either in delegated cooperation with specialist agencies or through projects and programmes implemented by Belgian Technical Cooperation.

The main bilateral (governmental and indirect) aid programmes related directly or indirectly to climate change issues are listed in tables 7.7 and 7.8. These programmes or projects are to be found in the sectors of forestry, agriculture, fishing, water (supply and treatment of waste water), energy, environmental protection, humanitarian aid, industry, transport and integrated development. Approximately 872 million EUR was given to these sectors in 2009-2012 via the bilateral channels. All actions taken into account are Official Development Assistance (ODA) and have been reported by Belgium to the OECD-DAC (Development Assistance Committee). As a whole, in these sectors, 191 million EUR was allocated for climate change via bilateral cooperation in the period 2009-2012 (21%).

Table 7.8 Belgian bilateral ODA (indirect cooperation) for the sectors of forestry, agriculture, fishing, water, energy, environmental protection, humanitarian aid, industry, transport and integrated development (multisectoral)

Indirect cooperation (expenditure in EUR)	2009	2009 climate-related	2010	2010 climate-related	2011	2011 climate-related	2012	2012 climate-related
Energy	1 197 318	1 018 449	17 758 577	13 090 741	8 286 245	8 017 680	76 137	76 137
Forestry	809 243	267 050	1 542 660	509 078	547 721	180 748	378 661	59 074
Agriculture	44 701 362	5 462 754	42 736 577	4 612 793	41 710 287	5 305 671	39 832 066	5 062 103
Fishing	387 577	72 947	632 175	111 709	484 950	96 990	469 896	68 488
Water supply and sanitation	6 074 810	1 796 200	6 611 180	1 975 256	5 362 402	1 560 997	6 138 851	2 165 838
Industry	29 455 616	100 142	3 360 912	16 128	9 837 029	101 159	1 355 789	27 319
Environment	2 658 301	674 179	3 773 202	870 580	2 558 984	647 745	2 195 550	626 620
Multisectoral	37 897 768	3 132 233	27 272 819	2 230 107	31 659 743	2 967 820	25 201 532	2 418 965
Humanitarian aid	5 488 191	1 645 707	8 030 659	2 409 198	3 171 024	951 307	5 137 374	1 541 212
Transport	25 770	-	40 130	-	-	-	-	-
Total	**128 695 956**	**14 169 660**	**111 758 891**	**25 825 589**	**103 618 385**	**19 830 117**	**80 785 856**	**12 045 757**

Belgium supports capacity development in Uganda under the CDM. An amount of 2 million EUR (2010 – 2014) is being provided. The project aims to strengthen technical capacity on CDM project formulation and promote clear understanding of CDM rules and procedures amongst Ugandan experts. It also aims to support the development of a portfolio of CDM projects and to create awareness on investment opportunities under the CDM. More information on the project can be found on the project's website: http://ccu.go.ug/index.php/projects-chai-projects/37-projects.

7.4.2. Flemish development cooperation

The bilateral development cooperation is concentrated in southern Africa, more specifically the countries South Africa, Mozambique and Malawi.

The efforts of the Flemish development cooperation for climate change focus on sustainable water management and water supply, (agro)forestry, agriculture and management of natural resources.

Water

Projects concerning water management and management of natural resources in developing countries are financed within the UNESCO International Hydrological Programme (IHP). For the period 2006-2010 this involved a contribution of 3 522 330 USD, equivalent to 42.2% of the total funds for the IHP.

Since 2003 there has been a large-scale water and sanitation programme in the district of Sekhukhune in South Africa.

The Flemish Partnership Water for Development was launched on World Water Day 2004 and is a cooperation between Flemish NGOs and non-profit organisations, companies, educational and research institutions, local authorities and the Flemish government. Flanders has committed to providing water and/or sanitation for an equal number of people in developing countries as there are inhabitants in Flanders by 2015. The Partnership intends to achieve this goal – and hence contribute to achieving the Millennium Development Goal 7c - via the implementation of projects in developing countries, the expansion of the support base, the bundling of knowledge and expertise, the mobilisation and increase of the financial means and the optimal application of knowledge and resources.

Forestry

In 2002 the Flemish Government set up a Flemish fund for the conservation of the Tropical Forest. This was set up in implementation of international commitments on biodiversity and sustainable forestry. The projects supported by the Flemish Tropical Forest Fund are small-scale projects that are firmly embedded in the local population. The projects' aims include protection of the biodiversity in national parks and tropical forests, the fight against illegal logging, the promotion of sustainable logging to bring certified wood to our markets, the promotion of ecotourism and support of reforestation of degraded areas and agroforestry.

In 2006 the operation of the Flemish Tropical Forest Fund was evaluated. The action of the Fund will in future be better geared to the challenge of climate change. The Fund wants to invest more in forestation and reforestation projects in the context of the Kyoto Protocol and simultaneously strive to ensure that such projects make a real contribution to maintenance of biodiversity and the social development of the population groups involved.

Agroforestry (ICRAF)

Driven by the commitment to fast-start finance, there has been intense collaboration with the International Centre for Research in Agroforestry (ICRAF) in the last four years. The first project in Malawi and Mozambique focuses on new methods for developing seed banks in order to mitigate the current seed shortage, so upgrading agroforestry. Agroforestry can be more extensively applied by improving the availability of tree seeds for small farmers and minor investments for an improved distribution system. Thanks in part to this project, Malawi has succeeded in becoming self-sufficient in the production of tree seeds involved.

The second project (involving an amount of 1.5 million EUR) aims to extend the good practice from Malawi to the entire southern African region. ICRAF focuses on setting up an international network of governmental organisations, international institutes, donors, NGOs and the private sector in order to increase investment in research, development, application and upscaling of agroforestry in southern Africa.

Lastly, work continued on the current cooperation between Irish Aid and ICRAF on improving food security by means of agroforestry in Malawi. The Flemish contribution (400 000 EUR) is concentrated on the Kasungu and Mzimba districts. Among other things, the project endeavours to improve the capacity of national and local institutions, NGOs and CBOs (community based organisations) to upgrade agroforestry to achieve evergreen and climate-smart agriculture in Malawi. This project also includes working on improving national and local stocks and providing germplasm (seed and seedlings) so that farmers can obtain quality tree sees and seedlings in due time.

Integration in the Flemish policy for development cooperation

In terms of themes, the Flemish development cooperation in Malawi and South Africa is concentrated on agriculture and food security. The results of the development projects are affected directly by the far-reaching impact of climate change on agriculture (the dwindling availability of irrigation water, the decrease in fertile soil, the shorter growing season, etc.).

Since 2012, all new Flemish development cooperation projects have been systematically screened for the results' potential vulnerability to climate change. A screening tool developed by KLIMOS[54] is used for this purpose. Climate change was always included as a transversal theme in the strategy notes between Flanders and the partner countries.

7.4.3. Walloon government

The Walloon government also contributes to Belgium's climate funding for the southern hemisphere. Further details of its commitment on fast-start finance are given in the boxed text on this subject.

The Walloon Region also contributes to the Yasuni initiative, along with other smaller contributions.

Yasuni

The aim of the Yasuni initiative was to preserve the Yasuni National Park by

[54] http://www.biw.kuleuven.be/lbh/lbnl/forecoman/klimos/klimosfrontpage.html

an undertaking not to extract almost 900 million barrels of crude oil located in this park. The Yasuni National Park is one of the richest and most bio diverse regions of the world and the home of several isolated indigenous tribes. In exchange, the government of Ecuador requested the international community to make contributions to the United Nations Development Programme (UNDP). These contributions will be used to protect the environment and biodiversity, and also to reduce poverty in Ecuador.

The Walloon Region has contributed 1.8 million EUR to this fund (as at June 2013).

Other Contributions

The Walloon Region contributes to the World Bank's Community Development Carbon Fund (CDCF), the aim of which is to support projects the combine mitigating greenhouse gas emissions and improving the living standards of people in the world's poorest countries. So, for instance, the Fund contributes to a fair distribution of carbon finance. The Walloon Region has contributed 330 000 EUR to this fund (as at June 2013).

The Walloon Region also undertakes the translation into French of the information bulletin for the French-speaking delegates in the UNFCCC forum and the reports on negotiations on climate change published by the IEPF. The Walloon region's contribution to these two initiatives was 70 000 EUR (as at June 2013).

7.5. Activities relating to technology transfer and capacity-building

The DGDC and the federated entities have always included the aspects of technology transfer and capacity-building in their bilateral agreements. The transfer of environmentally sound technology should allow rapid growth by the developing countries while safeguarding the general environment and natural resources. Capacity-building serves the same purpose, as it prepares the individual countries for complying with the provisions of the wide array of international agreements, national plans, technological development, etc. Multilateral and indirect actors conduct most activities in the field of capacity-building and technology transfer. Although it is difficult to make precise estimates of the share of the programmes and projects relating to climate change, the following is an overview of the efforts with a clear technology transfer component.

7.5.1. Cooperation with universities and scientific institutions

VLIR-UOS and CIUF

The DGDC supports the Flemish inter-university council for Development Cooperation to establish partnerships between universities and university colleges in Flanders and the South. There are research projects specifically relating to climate change between universities and university colleges in Flanders and the universities of Jimma and Bahir Dar in Ethiopia (renewable energy and hydrology), Dar Es Salaam in Tanzania (waste water management), the Hassan II University in Morocco (sustainable land management), José Mati Péres and José A. Eheveria universities in Cuba (biofuels), Mozambique (monitoring carbon storage), the university of Nairobi in Kenya (biodiversity) and the Universidad Mayor de San Simon in Bolivia (forestry research).

Through the French-speaking equivalent - CIUF (Conseil Interuniversitaire de la Communauté française de Belgique) - the DGDC supports research projects of universities in Wallonia and their partners in the South concerning climate change in Cameroon (University of Yaounde, green energy and agriculture and the university of Dschang, biotechnology), Senegal (Thiès Agricultural College, Jatropha), Central African Republic (university of Bangui, sustainable agriculture), DR Congo (universities of Kinshasa, Lubumbashi and Graben, on erosion, agriculture and food security), Morocco (National Forestry College and Mohamed I university, forestry research and water management for agriculture), the Philippines (Manila University, land and water management) and in Niger (Abdou Moumouni university, water management).

KLIMOS: Research Platform for Climate Change and Development Cooperation

KLIMOS is a partnership of different Flemish universities - KULeuven, VUB, UGent and the Katholieke Hogeschool Sint-Lieven - under which different research groups work on the following key themes: energy, food security and forests. With their research, these scientists support the DGDC in drafting policy for integrating mitigation and adaptation into development cooperation.

How is this development aid organised? Firstly, KLIMOS sets out policy recommendations in various research papers based on the findings of research conducted in both the northern and southern hemispheres. Secondly, KLIMOS researchers are directly involved in training sessions on different environmental topics for DGDC staff and the partners in the South.

Research papers have been completed on topics including the following:

- the impact of certification on stopping deforestation
- climate change and food security

- REDD: Reducing Emissions from Deforestation and Forest Degradation
- climate matching and climate envelope analysis as support for a food security policy
- the ecological footprint of the mobility of development organisations
- new trends in traditional bio-energy in developing countries
- eco-taxation
- sustainable town planning and urban development

Doctorate students from the KLIMOS network undertook (field) research in various countries in the South in 2011. They received separate funding from VLIR-UOS for a number of studies.

Data from **Peru** are analysed to examine how coffee plantations can play a role in REDD (Reducing Emissions from Deforestation and Forest Degradation). Research in carbon storage in forests and trees is being undertaken in cooperation with the Jimma University **in Ethiopia**. A doctorate student from Ethiopia paid a short research visit to Belgium for his thesis.

KLIMOS cooperates with the University of Limpopo in South Africa on sustainable higher education and the KLIMOS toolkit (see below).

In 2010 KLIMOS started developing a toolkit to help make the subject of 'sustainable environment' an integral part of our development programmes. The toolkit was further developed in 2011, with different training sessions organised to support use of this instrument. In addition, KLIMOS was involved in a four-day course on "Adaptation to climate change and development cooperation". This course was for DGDC staff and it introduces a step-by-step methodology for incorporating climate issues when developing strategies, plans, programmes and projects for development cooperation. The course was run in 2012 in a large number of our partner countries, and the local executive partners were also invited. Two regional workshops were held in 2012 - in Bamako (for Benin, Niger, Senegal, Morocco en Mali) and Kampala (in English, for Rwanda, Mozambique, Tanzania, South Africa and Uganda).

Scientific institutions

DGDC supports the Royal Museum for Central Africa and the Royal Belgian Institute of Natural Sciences in their projects for capacity-building of scientists in the South. The aim is to educate researchers in the South in the study of indigenous fauna and flora to provide a scientific basis for improved management and protection of biodiversity.

The Royal Belgian Institute of Natural Sciences was also called upon to improve capacity concerning protection of biodiversity and development cooperation in-house.

The Meise botanical gardens, the Royal Museum for Central Africa and the Royal Belgian Institute of Natural Sciences, together with the Congolese university, support the Biodiversity Centre in Kisangani.

OECD-DAC-EPOC Task Team on Climate Change and Development

The DAC-EPOC High Level meeting in May 2009 authorised this joint task force of the committees for development cooperation and the environment to further extend the OECD action on adaptation and development. Guidelines were issued on integrating climate change adaptation into development cooperation. Based on these guidelines, members of German development cooperation developed a training course on climate change adaptation and development. The Belgian Federal Government funded the translation of this course into French so that it can also be distributed in French-speaking countries in the South.

7.5.2. Support in attracting financing for mitigation activities in developing countries

End of 2009, the FPS Health, Food Chain Safety and Environment launched an initiative to promote CDM Programme of Activities (PoA) development in five African countries (Rwanda, Democratic Republic of Congo, Uganda, Tanzania and Mozambique). The initiative consists of several phases:

1. a scoping study on the opportunities for PoAs and development of two Project Idea Notes (PIN) per country (2010 – 2011).
2. support to develop two PoAs (2012 – 2014):
   - a renewable Energy PoA in Rwanda
   - a treatment of Municipal Waste PoA in Mozambique
3. support in the identification of opportunities for a sustainable charcoal production sector in Mozambique and Rwanda to benefit from climate financing, either through the CDM or in the NAMA framework (2013 – 2015).

The CDM may no longer be able to deliver the necessary funding, especially for those projects for which carbon financing is the sole or the most important revenue source. It was therefore decided to expand the scope of work towards the development of a NAMA (Nationally Appropriate Mitigation Action) framework. The total budget for these activities amounts to 391 600 EUR. More information can be found at http://www.climatechange.be/jicdmtender/head.php3?id_rubrique=3.

References:

DGDC Annual Report 2010, 2011 and 2012

Flemish Development Cooperation Annual Report 2012

Yellow Book on Multilateral Cooperation, 2011

ODA database, DGDC

Minister's policy memorandum, 2009 and 2011

Table 7.9 Climate-related expenditure in 2009 per country

	Climate-related expenditure in 2009									
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
AFGHANISTAN	-	-	100	-	-	-	-	1 045	1 440 149	-
AFRICA	531 224	53 968	1 124 322	30 100	862 333	-	-	285 976	-	-
ALGERIA	-	-	14 634	-	388 360	39 078	-	18 559	-	-
ASIA	-	-	-	-	-	-	8 744	3 700	-	150 000
BANGLADESH	-	-	-	-	61 318	-	-	-	-	-
BENIN	-	-	462 131	-	162 274	-	-	106 921	-	-
BOLIVIA	-	336 792	138 213	-	3 118	-	36 589	205 064	-	-
BRAZIL	-	1 910	179 916	-	-	-	-	34 133	-	-
BURKINA FASO	3 200	31 288	462 482	-	74 832	-	23 312	212 901	-	-
BURUNDI	-	-	511 855	-	56 938	-	-	469 761	26 635	-
CAMBODIA	-	-	66 526	-	45 310	-	-	1 156	-	-
CENTRAL AFRICAN REPUBLIC	-	-	3 912	-	-	-	-	-	-	-
CHILE	-	37 745	4 600	-	44 869	-	17 624	17 304	-	-
CHINA	-	-	31 143	-	-	-	-	33 646	-	-
COLOMBIA	-	-	97 249	-	-	-	-	1 615	-	-
CONGO BRAZZAVILLE	-	-	-	-	-	-	15 000	240	-	-
DR CONGO	94 190	306 710	1 081 081	145 611	748 875	-	367 128	795 995	880 846	-
COSTA RICA	-	-	2 149	-	-	-	-	631	-	-
CUBA	315 777	-	58 047	-	-	-	26 330	5 002	-	-
DOMINICAN REPUBLIC	142 535	-	4 514	-	-	-	-	-	-	-
ECUADOR	-	39 646	233 822	-	253 862	-	46 684	17 576	-	-
EL SALVADOR	-	-	57 707	-	-	-	-	-	-	-
ETHIOPIA	-	-	9 668	-	13 492	-	6 801	34 763	-	-
EUROPE	-	-	-	-	-	-	72 598	-	-	-

Climate-related expenditure in 2009										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
PHILIPPINES	-	-	-	-	330 111	-	-	-	-	-
PHILIPPINES	-	-	149 022	-	-	-	-	9 164	-	-
GAMBIA	-	-	25 680	-	3 525	-	-	-	-	-
GHANA	-	-	33 820	-	135 490	-	4 620	-	-	-
GUATEMALA	56 118	-	92 079	-	-	-	-	12 468	33 393	-
GUINEA	-	-	81 550	-	-	-	-	-	-	-
GUINEA BISSAU	-	-	14 032	-	11 976	-	-	-	-	-
GUINEA BISSAU	-	-	-	-	-	-	-	-	-	-
HAITI	-	-	65 170	-	209 351	-	-	36 466	240 485	-
HONDURAS	- 12 804	-	63 766	-	-	-	-	1 989	-	-
INDIA	-	-	5 718	-	2 730	-	-	207 165	73 973	-
INDONESIA	-	-	65 306	-	-	-	16 288	1 633	56 114	-
COTE D'IVOIRE	-	-	25 216	-	-	-	-	-	-	-
JAMAICA	-	-	-	-	68 230	-	-	-	-	-
CAMEROON	-	-	113 387	-	-	48 152	-	-	13 841	-
KAZAKHSTAN	-	-	-	-	-	-	9 900	-	-	-
KENYA	3 797 373	-	50 838	-	2 000	-	-	-	-	-
LAOS	-	-	19 834	-	-	-	-	2 438	-	-
LATIN AMERICA	-	-	12 819	-	-	-	7 144	69 228	-	-
LEBANON	-	-	-	-	-	-	-	4 536	671 714	-
MADAGASCAR	-	40 922	88 373	-	96 866	-	-	-	-	-
MALAWI	-	-	516 771	-	-	-	-	350	-	-
MALI	-	-	285 568	-	174 194	-	-	92 597	-	-
MOROCCO	-	25 991	142 082	-	2 612 112	10 522	14 502	116 003	-	-
MAURITANIA	-	-	11 000	-	-	-	-	68 703	-	-

Climate-related expenditure in 2009										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
MAURITIUS	-	-	-	-	-	-	-	-	-	-
MEXICO	-	-	12 922	-	-	-	-	23 764	-	-
MOZAMBIQUE	1 527 500	-	32 637	-	-	-	-	56 348	-	-
NEPAL	-	-	51 794	-	-	-	-	21 100	-	-
NICARAGUA	-	-	85 886	-	-	-	-	19 340	-	-
NIGER	-	-	261 295	-	754 166	-	-	416 830	-	-
NIGERIA	-	-	-	-	1 500	-	-	-	-	-
UGANDA	-	-	174 425	-	84 950	-	50 416	309 142	150 000	-
PALESTINIAN TERRITORIES	401 924	-	92 001	-	14	-	-	9 583	483 480	-
PERU	646 158	18 141	264 443	-	6 850	-	-	334 770	144 000	-
RWANDA	9 934 738	229 891	1 193 808	-	947 195	-	11 106	431 228	-	-
SENEGAL	10 000	-	358 381	12 310	506 072	-	33 290	229 218	-	-
SOMALIA	-	-	-	-	-	-	-	-	150 000	-
SRI LANKA	-	-	-	-	-	-	51 444	-	176 419	-
TANZANIA	-	-	241 735	-	153 436	47 433	275 201	129 292	-	-
THAILAND	-	-	7 790	-	-	-	-	-	-	-
TOGO	-	-	86 045	-	-	-	-	492	-	-
TUNISIA	-	15 398	- 11 103	-	46 250	1 889	-	41 928	-	-
UNIVERSAL	3 186 550	10 406	4 452 300	-	4 055 837	334 452	11 130 577	3 137 344	2 325 443	-
VIETNAM	13 505	-	610 929	30 537	954 181	-	57 539	162 061	-	-
ZIMBABWE	-	-	5 837	-	-	-	-	1 502	300 000	-
SOUTH AFRICA	-	-	480 122	-	18 683	500	16 444	26 883	-	-
Final total	**20 647 987**	**1 148 808**	**14 807 347**	**218 558**	**13 891 298**	**482 026**	**12 299 280**	**8 219 552**	**7 166 492**	**150 000**

Table 7.10 Climate-related ODA in 2010 per country

Climate-related ODA in 2010										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
AFGHANISTAN	-	-	75 000	-	-	-	-	1 165	1 543 535	-
AFRICA	614 631	42 202	715 929	-	459 245	-	265 007	73 742	37 500	-
ALGERIA	-	-	9 037	-	681 177	- 20 562	-	26 054	-	-
ASIA	800 000	-	-	-	-	-	11 344	100 219	-	100 000
BANGLADESH	-	-	-	-	44 773	-	-	-	-	-
BENIN	-	-	505 959	640	242 485	-	-	205 381	4 333	-
BOLIVIA	-	72 563	121 412	-	12 998	-	34 259	236 549	-	-
BRAZIL	-	-	163 994	-	-	23 746	-	33 809	-	-
BURKINA FASO	-	660	303 172	-	897 464	-	7 888	112 472	-	-
BURUNDI	-	-	576 514	-	61 618	-	-	553 057	326 046	-
CAMBODIA	10 000	-	23 728	-	-	-	-	-	-	-
CHILE	-	19 081	-	-	-	-	-	18 794	2 700	-
CHINA	-	-	28 665	-	-	-	33 000	41 205	-	-
COLOMBIA	-	-	143 926	-	-	-	-	-	-	-
DR CONGO	1 830 270	229 711	941 750	245 345	764 522	15 630	407 900	409 777	1 356 994	-
CONGO BRAZZAVILLE	-	-	-	-	-	-	15 000	-	-	-
COSTA RICA	-	-	-	-	-	-	-	-	-	-
CUBA	94 600	-	48 158	-	-	-	22 210	5 446	108 765	-
DOMINICAN REPUBLIC	128 609	-	2 797	-	-	-	-	-	55 656	-
ECUADOR	-	34 763	225 078	-	252 889	-	31 414	17 447	-	-
EL SALVADOR	2 500	-	55 361	2 000	-	-	-	-	-	-
ETHIOPIA	-	-	5 620	-	47 301	-	-	172 745	-	-
EUROPE	-	-	-	-	-	-	71 439	-	72 000	-
PHILIPPINES	615 000	-	185 930	-	295 111	-	-	7 422	-	-

Climate-related ODA in 2010										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
GAMBIA	-	-	11 975	-	1 800	-	-	-	-	-
GHANA	-	-	27 096	-	5 905 795	-	-	-	-	-
GUATEMALA	-	-	85 858	-	-	-	-	12 704	30 601	-
GUINEA	-	-	82 539	-	-	-	-	-	22 500	-
GUINEA BISSAU	-	-	13 979	-	-	-	-	-	22 500	-
HAITI	-	-	77 829	-	183 613	-	-	90 621	2 716 613	-
HONDURAS	-	-	47 834	-	-	-	-	2 306	-	-
INDIA	208 000	-	5 000	-	10 380	-	-	2 556	-	-
INDONESIA	-	-	86 160	-	-	-	16 288	2 013	39 920	-
COTE D'IVOIRE	-	-	39 613	-	6 279	-	-	-	22 500	-
JAMAICA	-	-	-	-	58 426	-	-	-	-	-
CAMEROON	-	-	127 365	-	341 785	1 312	-	1 143	12 253	-
KAZAKHSTAN	-	-	-	-	-	-	11 550	-	-	-
KENYA	1 148 864	-	21 462	24 585	-	-	8 041	-	-	-
LAOS	-	-	19 368	-	-	-	8 000	-	-	-
LATIN AMERICA	-	-	15 661	-	-	-	95 890	71 592	-	-
LEBANON	-	-	-	-	-	-	-	1 526	180 000	-
LIBERIA	-	-	-	-	4 190	-	-	-	22 500	-
MADAGASCAR	-	33 864	67 440	-	122 296	-	-	-	-	-
MALAWI	-	-	560 307	-	256 050	-	-	-	-	-
MALI	-	-	198 829	-	49 380	-	-	72 544	-	-
MOROCCO	-	30 276	30 223	-	1 902 709	-	14 298	137 874	-	-
MAURITANIA	-	-	11 000	-	-	-	12 200	-	-	-
MEXICO	-	-	1 208	-	-	-	-	13 893	-	-
MONGOLIA	-	-	-	-	-	-	-	-	-	-
MOZAMBIQUE	154 615	-	73 855	-	-	-	-	25 018	-	-

Climate-related ODA in 2010										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
NEPAL	1 550	-	51 794	-	-	-	-	5 250	-	-
NICARAGUA	8 842 000	-	80 248	-	-	-	-	15 359	-	-
NIGER	-	-	400 932	-	3 204 195	-	-	240 523	-	-
NIGERIA	-	-	-	-	1 440	-	-	-	-	-
UGANDA	-	-	169 742	-	67 716	-	2 548	86 077	-	-
PAKISTAN	-	-	-	-	298 896	-	-	-	780 866	-
PALESTINIAN TERRITORIES	-	-	18 997	-	31 127	-	-	22 496	1 245 000	-
PERU	2 738 659	347 879	175 844	-	-	-	10 608	296 953	-	-
RWANDA	5 048 167	340 698	1 058 725	-	810 057	-	-	179 726	-	-
SAO TOME AND PRINCIPE	-	-	-	-	-	-	-	-	-	-
SENEGAL	5 000	-	205 290	-	690 473	-	29 730	47 706	73 500	-
SIERRA LEONE	-	-	-	-	-	-	-	-	22 500	-
SOMALIA	-	-	-	-	-	-	-	40	-	-
SRI LANKA	-	-	-	-	-	-	44 383	-	-	-
TANZANIA	400 275	-	164 023	-	87 249	30 096	152 711	72 772	-	-
THAILAND	-	-	7 823	-	-	-	-	-	-	-
TOGO	-	-	91 570	-	-	-	-	534	-	-
TUNISIA	-	-	2 810	-	26 612	- 3 998	-	21 671	-	-
UNIVERSAL	1 990 713	10 012 251	4 974 281	-	4 008 743	322 933	19 493 139	2 563 657	1 583 418	-
VIETNAM	619 850	-	528 850	14 531	1 090 951	-	56 819	132 519	-	-
ZIMBABWE	-	-	6 968	-	-	-	-	1 438	-	-
SOUTH AFRICA	-	-	666 720	-	6 250	-	-	30 898	-	-
Final total	**25 253 305**	**11 163 948**	**14 341 250**	**287 101**	**22 925 992**	**369 156**	**20 855 666**	**6 166 694**	**10 282 199**	**100 000**

Table 7.11 Climate-related ODA in 2011

Climate-related ODA in 2011										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
AFGHANISTAN	-	-	-	-	-	-	-	-	600 000	-
AFRICA	1 042 450	3 690	2 223 056	-	1 129 432	-	252 783	264 136	975 000	-
ALGERIA	-	-	-	-	228 434	2 176	-	27 067	-	-
ANGOLA	-	-	-	-	-	-	-	13 611	-	-
ASIA	800 000	-	-	-	-	-	-	85 151	-	180 000
BANGLADESH	-	-	-	-	38 598	-	-	-	-	-
BENIN	-	-	593 875	-	67 854	-	-	174 728	12 068	-
BOLIVIA	-	271 981	140 071	-	56 682	-	327 607	158 894	-	-
BRAZIL	-	-	58 769	-	-	14 389	-	47 688	-	-
BURKINA FASO	-	-	537 357	44 048	42 103	2 700	-	95 290	-	-
BURUNDI	-	-	989 109	-	95 020	-	-	815 830	192 582	-
CAMBODIA	8 900	-	55 327	-	11 328	-	-	13 636	-	-
CENTRAL AFRICAN REPUBLIC	-	-	-	-	-	-	-	-	-	-
CHILE	-	9 471	1 250	-	-	-	-	8 268	-	-
CHINA	-	-	18 538	-	-	-	16 500	44 788	-	-
COLOMBIA	-	-	33 640	-	-	-	-	29 930	-	-
CONGO BRAZZAVILLE	-	-	-	-	-	-	7 500	-	-	-
DR CONGO	4 470 267	153 829	1 461 760	189 740	654 214	-	147 451	583 096	347 320	-
COSTA RICA	-	-	-	-	-	-	-	-	-	-
CUBA	113 012	-	28 100	-	-	-	-	16 324	-	-
DOMINICAN REPUBLIC	114 702	-	-	-	-	-	-	-	-	-
ECUADOR	-	15 398	293 973	-	245 745	-	92 641	29 725	-	-
EL SALVADOR	-	-	39 739	-	250	-	-	11 145	-	-
ERITREA	-	-	-	-	-	-	-	-	-	-

Climate-related ODA in 2011										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
ETHIOPIA	-	-	2 679	-	49 313	-	38 520	155 249	-	-
EUROPE	-	-	-	-	-	-	113 050	-	-	-
PHILIPPINES	-	-	-	-	282 333	-	-	-	-	-
PHILIPPINES	- 615 000	-	158 532	-	-	-	-	21 594	-	-
GAMBIA	-	-	14 056	-	1 800	-	-	-	-	-
GHANA	-	-	88 157	-	122 575	-	-	5 833	-	-
GUATEMALA	- 303 056	-	80 419	-	250	-	-	34 851	21 197	-
GUINEA	-	-	57 472	-	-	-	-	9 669	-	-
GUINEA BISSAU	-	-	7 620	-	21 160	-	-	8 907	-	-
HAITI	-	-	29 256	-	210 316	-	-	38 866	1 800 000	-
HONDURAS	- 430 096	-	68 167	-	-	-	-	13 471	-	-
INDIA	1 325 261	-	650	-	4 663	-	-	2 703	-	-
INDONESIA	-	660	174 533	-	-	-	-	300	143 367	-
COTE D'IVOIRE	-	-	36 748	-	-	-	-	-	225 000	-
JAMAICA	-	-	-	-	47 887	-	-	-	-	-
CAPE VERDE (ISLANDS)	-	-	-	-	-	-	-	9 132	-	-
CAMEROON	-	-	110 084	-	601 618	- 22 606	-	23 258	-	-
KAZAKHSTAN	-	-	-	-	-	-	-	-	-	-
KENYA	3 343 211	-	48 408	16 355	-	-	7 395	-	-	-
KOSOVO	-	-	-	-	-	-	-	8 015	-	-
LAOS	-	-	23 995	-	-	-	-	6 352	-	-
LATIN AMERICA	-	-	-	-	-	-	52 665	41 232	619 334	-
LEBANON	-	-	-	-	-	-	-	4 401	99 530	-
LIBERIA	-	-	-	-	12 011	-	-	-	-	-
MADAGASCAR	-	18 937	34 042	-	117 847	-	-	-	-	-

Climate-related ODA in 2011										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
MALAWI	-	-	374 548	-	-	-	-	350	-	-
MALI	-	-	267 979	-	116 464	4 800	-	55 832	49 262	-
MOROCCO	17 560	-	32 897	-	3 941 169	-	10 211	104 249	-	-
MEXICO	-	-	3 582	-	-	-	-	14 464	-	-
MONGOLIA	-	-	-	-	-	74 700	-	-	-	-
MONTSERRAT	-	-	-	-	-	-	-	-	-	-
MOZAMBIQUE	3 219 183	-	104 593	-	-	-	13 542	122 110	84 780	-
NEPAL	-	-	51 794	-	-	-	-	125	-	-
NICARAGUA	2 238 924	-	205 563	-	13 878	-	-	20 620	-	-
NIGER	-	-	480 243	-	535 683	-	-	181 448	-	-
UGANDA	-	-	328 621	-	79 447	-	3 468	164 063	-	-
PALESTINIAN TERRITORIES	-	-	1 500	-	87 785	-	10 211	28 054	1 770 000	-
PERU	3 348 094	90 996	176 335	-	37 299	-	270 158	128 730	-	-
RWANDA	8 230 858	192 849	589 133	-	1 693 966	2 700	-	169 409	-	-
SENEGAL	12 500	-	366 186	-	1 385 396	13 800	28 620	315 976	-	-
SOMALIA	-	-	-	-	-	-	-	4 364	37 800	-
SRI LANKA	-	-	-	-	-	-	33 258	-	-	-
TANZANIA	-	-	289 454	-	123 860	18 585	170 494	138 624	300 000	-
THAILAND	-	-	8 286	-	-	-	-	-	-	-
TOGO	-	-	28 032	-	-	-	-	200	-	-
TUNISIA	-	-	- 5 475	-	22 985	720	-	17 327	-	-
UNIVERSAL	2 407 043	15 142	5 664 475	-	3 953 637	335 535	30 424 993	2 826 750	793 163	-
VIETNAM	- 10 000	-	288 479	36 587	1 459 227	5 880	58 651	153 511	-	-
SOUTH AFRICA	-	-	242 017	-	53 111	-	6 000	51 723	-	-
SOUTH SUDAN	-	-	-	-	-	-	-	-	1 200 000	-
Final total	**29 333 813**	**772 953**	**16 907 625**	**286 730**	**17 545 337**	**453 379**	**32 085 716**	**7 301 069**	**9 270 402**	**180 000**

Table 7.12 Climate-related ODA in 2012

Climate-related ODA in 2012										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
AFGHANISTAN	-	-	25 024	-	-	-	-	-	-	-
AFRICA	-	-	54 998	-	-	-	-	74 939	600 000	-
ALGERIA	-	-	-	-	215 158	-	-	4 115	-	-
ANGOLA	-	-	-	-	-	-	-	1 686	-	-
ASIA	800 000	-	-	-	-	-	-	92 809	-	100 000
BANGLADESH	-	-	-	-	-	-	-	-	600	-
BENIN	-	-	611 804	-	371 860	-	-	101 106	7 109	-
BOLIVIA	-	254 727	359 463	-	3 044	-	27 608	71 670	-	-
BRAZIL	-	-	54 011	-	-	21 229	-	42 934	-	-
BURKINA FASO	-	-	505 731	17 185	12 397	-	-	40 726	-	-
BURUNDI	-	-	1 254 148	-	66 935	-	-	762 336	-	-
CAMBODIA	-	-	48 315	-	-	-	-	15 323	-	-
CENTRAL AFRICAN REPUBLIC	-	-	-	-	-	-	-	-	-	-
CHILE	-	-	-	-	-	-	-	-	-	-
CHINA	-	-	-	-	-	-	-	12 321	-	-
COLOMBIA	-	-	46 018	-	-	-	-	32 058	-	-
CONGO BRAZZAVILLE	-	-	-	-	-	-	-	-	-	-
DR CONGO	4 813 499	24 129	1 399 717	160 318	356 504	-	80 636	754 346	173 317	-
COSTA RICA	-	-	-	-	-	-	-	-	-	-
CUBA	66 846	-	18 090	-	-	-	-	13 417	-	-
DOMINICAN REPUBLIC	-	-	-	-	-	-	-	-	-	-
ECUADOR	-	24 669	411 171	-	286 383	-	89 515	14 312	-	-
EL SALVADOR	-	-	39 285	-	-	-	-	11 243	-	-
ERITREA	-	-	3 847	-	-	-	-	-	-	-
ETHIOPIA	-	-	2 988	-	23 678	-	18 319	71 772	-	-

Climate-related ODA in 2012										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
PHILIPPINES	-	-	156 697	-	-	-	-	19 439	-	-
GAMBIA	-	-	15 131	-	1 800	-	-	-	-	-
GHANA	1 350 000	-	28 798	-	76 979	-	-	4 706	-	-
GUATEMALA	-	-	78 395	-	-	-	-	30 083	23 594	-
GUINEA	-	-	57 875	-	-	-	-	9 586	-	-
GUINEA BISSAU	-	-	8 931	-	-	-	-	9 290	-	-
HAITI	-	-	25 708	-	174 875	-	-	13 392	851 009	-
HONDURAS	-	-	73 393	-	-	-	-	13 296	-	-
INDIA	-	-	-	-	16 560	-	-	-	-	-
INDONESIA	-	660	172 424	-	-	-	-	300	134 107	-
COTE D' IVOIRE	-	-	24 039	-	-	-	-	-	-	-
JAMAICA	-	-	-	-	-	-	-	-	-	-
CAPE VERDE ISLANDS	-	-	-	-	-	-	-	9 515	-	-
CAMEROON	-	-	16 625	-	215 399	-	-	16 200	-	-
KAZAKHSTAN	-	-	-	-	-	-	-	-	-	-
KENYA	314 558	-	34 087	14 675	9 914	-	22 453	-	-	-
KOSOVO	-	-	-	-	-	-	-	-	-	-
LAOS	-	-	25 083	-	-	-	-	7 112	-	-
LATIN AMERICA	-	-	-	-	-	-	-	51 346	-	-
LEBANON	-	-	-	-	-	-	-	-	983	-
LIBERIA	-	-	-	-	3 845	-	-	-	-	-
MADAGASCAR	-	-	35 754	-	138 585	-	-	-	-	-
MALAWI	-	-	-	-	241 050	-	-	-	-	-
MALI	-	-	323 085	-	546 301	-	-	4 736	43 765	-

Climate-related ODA in 2012										
Country/region	Energy	Forestry	Agriculture	Fishing	Water supply and sanitation	Industry	Environment	Multisectoral	Humanitarian aid	Transport
MOROCCO	-	-	136 461	-	1 288 611	-	1 659	73 001	369	-
MEXICO	-	-	1 549	-	-	-	-	-	-	-
MOZAMBIQUE	-	-	62 422	-	-	-	15 395	17 753	-	-
NICARAGUA	-	-	213 819	-	-	-	1 500	18 518	-	-
NIGER	-	-	441 145	-	2 645	-	-	304 504	-	-
NIGERIA	-	-	-	-	-	-	-	-	-	-
UGANDA	-	-	277 105	-	52 761	-	199 384	85 257	-	-
PAKISTAN	-	-	-	-	-	-	-	-	-	-
PALESTINIAN TERRITORIES	-	-	-	-	-	-	10 801	100 829	2 475 000	-
PERU	12 449	-	174 052	-	42 248	-	411 157	31 331	-	-
RWANDA	1 064 812	332 430	461 434	-	1 387 983	-	8 261	77 607	14 451	-
SENEGAL	-	-	477 559	-	1 018 177	-	132 762	26 219	-	-
SIERRA LEONE	-	-	-	-	-	-	-	-	-	-
SRI LANKA	-	-	-	-	221 470	-	24 401	-	-	-
TANZANIA	-	-	249 288	-	295 480	-	300 362	210 232	-	-
THAILAND	-	-	4 253	-	-	-	-	-	-	-
TOGO	-	-	17 001	-	-	-	-	1 212	-	-
TUNISIA	-	-	-	-	-	-	-	-	-	-
UNIVERSAL	1 861 662	-	4 645 186	-	1 891 187	-	18 975 186	2 080 189	820 723	-
VIETNAM	9 292	-	262 668	36 628	1 520 604	6 090	61 017	3 419	-	-
SOUTH AFRICA	-	-	256 088	-	30 450	-	3 931	6 072	-	-
SOUTH SUDAN	-	-	-	-	-	-	-	-	225 000	-
Final total	**10 293 118**	**636 616**	**13 590 667**	**228 806**	**10 512 882**	**27 319**	**20 384 344**	**5 342 258**	**5 370 027**	**100 000**

Examples of projects and programmes with a technology transfer component

Project/programme title: **AMAYO II**			
Purpose: Expanding production of clean and renewable energy (wind energy) Decreasing dependence on expensive fossil fuel imports and lowering the trade deficit Availability of low-cost, safe and clean electricity			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Nicaragua	Wind energy	USD 12 million	2.5 years
Description: extension of the existing wind energy project, AMAYO I, in south-western Nicaragua with 23MW			
Indicate factors which led to project's success: Favourable wind conditions allow above average energy production Well experienced suppliers achieve above average turbine availability Management and supplier provide for efficient operation and maintenance performance			
Technology transferred: Training of local staff in view of transferring the administration of the site to local management within +/- 5 years			
Impact on greenhouse gas emissions/sinks (optional) The installation of 23MW wind energy avoids GHG-emissions of 67 000 tonnes CO_2/p.a			

Project/programme title: **Công Ty Methis environmental Vietnam**			
Purpose: Introduction of renewable energy (solar energy) (feasibility study) in VN			
Recipient Country:	**Sector:**	**Total grant:**	**Years in operation:**
Vietnam	Energy	EUR 100 000	Feasibility study completed. Start operation in 2014
Description: Feasibility study on the implementation of a solar power project of 50 up to max 100MW capacity within a period of ten years providing clean energy to airports in Vietnam. A first project named "Rainbow" has been implemented by Methis ENV VN and negotiation has started to duplicate the model to other airports in Vietnam. Based on this first project, VN Methis ENV aims to be an important player with field experience to develop solar power projects in the framework of a PPP or private partnership.			
Indicate factors which led to project's success: Deep knowledge of the sponsor of the solar energy sector/technology			
Technology transferred: The new technology will lead to electricity production for the relevant airports but also for the storage of cool air in "cold wells" that will be redistributed into the air-cooling system of those relevant airports.			
Impact on greenhouse gas emissions/sinks (optional) Positive			

Project/programme title: **Afromaison. Protection of drinking water services by means of basin protection, sensitization and capacity building in the municipality Fort Portal, Uganda**			
Purpose: The Afromaison project aims to put the integrated management of natural resources in Africa into practice with instruments that mainly provide support at sub-national policy level and are adapted to local socio-economic, technical and institutional aspects. This project focuses specifically on safeguarding the drinking water supply of the Fort Portal municipality through improved management in the upstream section of the Mpanga basin in Uganda.			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Uganda	Water and sanitation	EUR 101 730	2012-2013

Description: The expected outcomes for this project are: 1. Basin administrators and stakeholders responsible for drinking water supply have gained a better insight into water management and ecosystem services in the upstream basin of the Manga River. 2. Vulnerable areas responsible for producing sediment and reducing the water supply are known. A list of priorities has been drawn up listing the vulnerable areas and describes the causes and intensity of degradation. At least two vulnerable areas have been physically demarcated and recognized by the local community. 3. Management committees (e.g. drinking water committees, wetland committees, etc.) are known and are better able to manage natural resources in a sustainable and integrated way. The potential sustainable management options are known to them and are being applied in at least two vulnerable areas. 4. With the support of the local partner university, the local authorities are capable of formulating measures for the sustainable management of the basin, taking into consideration the natural regime of the Mpanga river, the ecosystem services in the basin and future scenarios.
Indicate factors which led to project's success: Several local and European partners cooperate in and contribute to the project. This contribution can be financial, in the form of technical expertise, or a combination of both. The partnerships are creating synergies and a healthy exchange of knowledge and expertise, for the benefit of all involved (North-South cooperation, but also North-North and South-South).
Technology transferred: Each introduction of infrastructure or technology or water resource management is preceded or followed by technical and financial training and workshops.
Impact on greenhouse gas emissions/sinks (optional)

Project/programme title: **Kenya: Adapting to Climate Change in Arid and Semi-Arid Lands (KACCAL) 2009-2013**
Purpose: KACCAL is a USD 1 million project of UNDP supporting poor and vulnerable communities in Mwingi District to enhance their adaptive capacity to drought and floods. The project also strengthes climate risk management planning and capacity of district-level planners to mainstream climate change into district-level sectoral development plans.

Recipient Country:	Sector:	Total Funding:	Years in operation:
Kenya	Climate	EUR 150 000 by the Government of Flanders	2009-2013 (subsidized in 2012)
Description: Mwingi district is currently experiencing land degradation because of tree felling to produce charcoal and/or clear land for cultivation. Land degradation worsens the affects the effects of climate variability and change on communities. One way to stern this degradation is to minimize the pressure on trees by using technologies that use less wood. The saved standing trees mitigate climate change by acting as carbon sink in addition to saving time for women who spend many hours fetching fuel-wood. The saved time would be used for productive work. Improved cook stove dissemination is presently high on the agenda of the government and many development partners mainly because of deforestation, CO_2 reduction, indoor air quality issues and economic concerns. To date, Mwingi has not benefitted from improved cook stoves as the feeling among government planners was that Mwingi communities had sufficient bush wood - a situation that is drastically changing.			
Indicate factors which led to project's success: Executed by UNDP, in cooperation with local NGO's, governments and beneficiaries			
Technology transferred: Purchase and installation of energy efficient cooking stoves, to replace the traditional 3-stone arrangement typically used in rural households. The stoves are made of fired clay liners and have been piloted for many years by the Ministry of Agriculture through GTZ. The models are cast by locally trained artisans in the districts where the technologies were first introduced. 20 seedlings of fruit trees and other multi-purpose tree species (which could be used for fuel wood provision) planted by each household benefiting from an energy efficient cooking stove. This translates into planting at least 80 000 trees which would improve the livelihoods of the communities through improved nutrition and income from sale of fruit. Trials show that mango is appropriate and popular based on its ability to tolerate drought. Seedling nurseries established with appropriate water harvesting facility. The type of nursery envisaged is one covered by shade net and has water supplied through drip system. The water harvesting structure will be either a lined water pan shallow well or a sand dam based on the identified nursery site. Financially sustainable management arrangements will be identified through stakeholder consultations and based on good practice. Capacity developed for i) training local artisans to make stoves for Mwingi communities ii) training for installation of improved stoves iii) on-farm care of trees iv) marketing of fruits. Farmers will be organised into marketing groups to maximise supply and bargaining power with buyers for markets that are between 60 - 200km away.			

Project/programme title: Adapting water resource management in the Comoros to expected climate change: 2010-2014			
Purpose: Climate change and variability (e.g. variations in rainfall, increase in temperature, sea level rise and increased frequency in climatic hazards) have a negative impact on water supply and quality in the Comoros by reducing availability of water and dilution of contaminants (e.g. pollutants, salts and sediment). The Comoros Poverty Reduction and Growth Strategy reports have identified water security and quality as among the most critical problems facing the Comoros. Additionally, a vulnerability survey undertaken during the NAPA (2006) process listed the water sector as being the second most vulnerable sector to climate change. The problem is exacerbated by inadequate water resource management including inter alia: i) limited and inadequate water supply; ii) inadequate infrastructure and insufficient water treatment and; iii) quality monitoring has resulted in poor access to potable water. Moreover, people who do have access to drinking water of a poor quality frequently suffer from waterborne diseases. The goal of this UNDP project is to adapt water resource management to climate change in the Comoros whilst the project objective is to reduce the risk of climate change on lives and livelihoods from impacts on water resources in the Comoros.			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Comoros	Water / Climate	EUR 150 000 by the Government of Flanders	2010-2014 (subsidized in 2012-13)

Description:
Comorian communities, governments of the autonomous islands, and the national government presently lack the technical, and management capacity and physical and financial resources to overcome or cope with water resource management in the context of worsening climatic conditions. The goal of the project is to adapt water resource management to climate change in the Comoros whilst the project objective is to reduce the risk of climate change on lives and livelihoods from impacts on water resources in the Comoros. In so doing, this project will implement the adaptation priority "increase in water supply" and contribute to the adaptation priority "improvement of water quality", identified during the National Adaptation Programme of Action (NAPA) process. The project will work on the three islands that constitute the territory of the Comoros with a focus on improving water resources management to increase water supply and quality under changing climatic conditions.
To achieve this, the following outcomes will be delivered:

Institutions at a national and community level strengthened to integrate climate change information into water resources management.
Water supply and water quality improved for selected pilot communities to combat impacts of climate change.
Awareness and knowledge of adaptation good practice increased for continued process of policy review and development.

Project outcomes are jointly supported by UNDP and UNEP as joint Implementing Agencies for the GEF.

Indicate factors which led to project's success:
Executed by UNDP, in cooperation with local NGO's, governments and beneficiaries. Problems were already identified in NAPA and Comoros Poverty Reduction and Growth Strategy reports.

Technology transferred: The Flemish support is used to address the full scope of issues at the local level, working with the targeted communities in each of the three islands. It makes a direct contribution to achieving more sustainable results under the project's expected outcome: *Water supply and water quality for selection pilot communities to combat impacts of climate change improved*. The inhabitants of 3 locations benefit from this contribution as follows: *Community members trained to manage adaptive water interventions sustainably*. The activity would be the introduction of local water treatment technologies, such as localized ecologically-based water purification systems. Awareness raising and community mobilization will be undertaken to promote safe use of water and sanitation among the surrounding communities, in order to reduce water contamination. *Sustainable land management practiced in pilot sites*. The additional contribution would be provided to support the training and support of local agricultural producers in the sustainable and resilient use of agricultural land. This will include training to be delivered through the local Centres for Agricultural Expertise (Ministry of Agriculture) and the provision of starter seeds and agricultural tools for enhanced agricultural production.
Impact on greenhouse gas emissions/sinks (optional)

Project/programme title: Developing a people-centred wildlife policy in Zambia: Sharing revenue with communities in Game Management Areas: 2012-2013
Purpose: In terms of its Sixth National Development Plan, the Government of Zambia is committed to protecting the country's precious wildlife resources and vast protected area estate, and to growing nature-based tourism, promoting biodiversity conservation and economic growth with social equity. This UNDP project aims to prepare and promote a new policy proposal on revenue sharing in Zambia's Game Management Areas between the national wildlife authority and the communities living in these areas. This will give communities a stake in the system so that they are empowered to undertake co-management with the Zambian Wildlife Authority (ZAWA)—supporting anti-poaching efforts, acting as village scouts and participating in land-use planning. This in turn will enable the recovery of wildlife populations and create a virtuous cycle, further reducing pressure on the globally significant biodiversity of these areas and enabling expansion of sustainable tourism and related livelihoods.

Recipient Country:	Sector:	Total Funding:	Years in operation:
Zambia	Biodiversity	EUR 150 000 by the Government of Flanders	2012-2013 (subsidized in 2012)
Description: This project builds on groundwork laid by a UNDP-supported project carried out from 2006-2012 on *Reclassification and Effective Management of the National Protected Areas System*, funded by the GEF. The proposed project also assists in preparing the ground for a new GEF-funded project due to start in 2014, on *Strengthening Management Effectiveness and Generating Multiple Environmental Benefits within and around Protected Areas in Zambia*, and could be linked to the GEF-funded project's preparation activities. The revision of the wildlife policy and legislation is the crucial missing link between the two GEF-funded projects. In order for the policy to be successfully adopted and implemented, it must include revenue sharing aspects, as part of government's commitment to community-based natural resource management, creating the necessary policy underpinning for both biodiversity conservation and sustainable tourism to prosper.			
Indicate factors which led to project's success: Executed by UNDP, in cooperation with local NGO's, governments and beneficiaries.			
Technology transferred: This project deals mainly with capacity building (e.g. consulting stakeholders, reviewing and drafting policy proposals, formulating recommendations). Firstly, it will add value to the planned GEF investment in protected areas and tourism in Zambia from 2014-2018, by establishing key principles for community-based natural resource management and revenue sharing. Secondly, it will help to guide policy development in UNDP's large global portfolio of work in protected areas management, including co-management with local communities and indigenous peoples, providing both principles and practical guidelines for benefit sharing. Globally, expansion of sustainable tourism has not been accompanied by an automatic trickle-down effect of income and benefits to communities, and governments are seeking guidance in achieving growth with equitable distribution. This project offers an exciting opportunity to enable these principles to be implemented on the ground.			
Impact on greenhouse gas emissions/sinks (optional)			

Project/programme title: Flemish partnership Water for Development – *Vlaams Partnerschap Water voor Ontwikkeling (VPWvO)*			
Purpose: The Flemish Partnership Water for Development (VPWvO), a decentralized solidarity mechanism in the field of water and sanitation, brings together Flemish actors in the field of water. Through the Partnership, Flanders aims to help six million people (the same number of inhabitants in Flanders) in developing countries obtain safe drinking water and adequate sanitation by 2015, as described in MDG 7c.			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Mainly Africa + Ecuador	Water and sanitation		Since 2004
Description: For a Flemish Partnership project to be approved, at least three partners (2 Flemish and 1 local partner) must cooperate and contribute to the project. This contribution can be financial, in the form of technical expertise, or a combination of both. Projects can be subsidized by the Flemish government via this system, providing beneficiaries with direct access to clean water and sanitation infrastructure or to improved hygiene conditions. These projects are screened for different criteria. Although the primary aim of this programme is not to take measures to deal with the possible impact of the project in climate change or to deal with the possible risk posed by climate change, theyare taken into account in the evaluation, like other environmental issues. After all, provision of water and sanitation in a sustainable way has substantial effects on the climate situation.			
Indicate factors which led to project's success: The partnerships are creating synergies and a healthy exchange of knowledge and expertise, for the benefit of all involved (North-South cooperation, but also North-North and South-South). There is also a financial leverage effect with the financial input of the partners being used as the necessary "own means" needed to receive funding from Belgian or European development cooperation.			
Technology transferred: Water and sanitation infrastructure (pumps, pits, solar energy systems,…), bearing in mind the local human and financial capacity and the availability of the necessary materials. Each introduction of infrastructure or technology or water resource management is preceded or followed by technical and financial training and workshops.			
Impact on greenhouse gas emissions/sinks (optional)			

Project/programme title: "Construction de microcentrales hydro-électriques" (Construction of micro hydro plants)			
Purpose: Construction of two micro hydroelectric power plants in the districts of Rutsiro and Rubavu in Rwanda (2880 kW)			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Rwanda	DAC sector: 23065 – Hydroelectric plants and Dams	EUR 8 163 620	2006 to 2012
Description: Production of energy is a priority of Rwanda. The Economic Development and Poverty Reduction Strategy II 2013-2018 aims for a production of 500 MW. The current level is 100 MW. Belgium supported and will support renewable electricity production. Belgium supported the construction of two micro hydroelectric power plants in Keya and Nkora. The primary objective is not about climate change, but about energy production. However, the increasing part of energy produced by hydroelectric sources will reduce the part of energy coming from fuels, peat and other sources that can damage the environment.			
Indicate factors which led to project's success: No information.			
Technology transferred: micro hydroelectric power plant			
Impact on greenhouse gas emissions/sinks (optional)			

Project/programme title: Access to electricity for the rural population by utilization of renewable energy (EPRER)			
Purpose: Put relatively cheap electric energy at the rural population's disposal during times of lower consumption			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Rwanda	DAC code: 23030 – Energy production of energy (renewable sources)	EUR 7 042 335.3	2008-2013

Description: This programme has three outputs: electricity production from renewable sources, increasing electricity access, institutional support. The first output relates to the building of 2 micro hydroelectric power plants in Cyimbili and Rukarara. It also relates to the installation of solar panels at health centres (46 is the final target). The electricity produced by the solar panels is not injected to the network but directly benefits the rural population coming to the HC. The primary objective is not about climate change, but about energy production. However, the increasing part of energy produced by hydro and solar sources will reduce the part of energy coming from fuels, peat and others which can damage environment.
Indicate factors which led to project's success: No information.
Technology transferred: micro hydroelectric power plants and solar panels.
Impact on greenhouse gas emissions/sinks (optional)

Project/programme title: POLARIS			
Purpose: Expanding production of renewable energy (geothermal power). Renewable energy is strategically important for the country. Geothermal energy contributes to low-cost, stable, safe and clean electricity supply.			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Nicaragua	Geothermal power	USD 15 million	1 year
Description: Expansion of a geothermal power project with 2 X 36 MW capacity			
Indicate factors which led to project's success: Energy source with high stability >92% Committed and financially strong shareholders and strong management track record Government is supportive of geothermal development Nicaragua can reduce expensive fuel imports for electricity generation			
Technology transferred: State of the art technology suitable for efficient use of geothermal energy Project meets international environmental, social and safety standards Transfer of know-how for operations and maintenance of geothermal stations			
Impact on greenhouse gas emissions/sinks (optional) Positive avoids GHG-emissions of 362 000 tonnes CO_2/p.a			

Project/programme title: Semsa Mezapa			
Purpose: introduction of renewable energy and poverty alleviation			
Recipient Country:	**Sector:**	**Total Funding:**	**Years in operation:**
Honduras	Energy	USD 3 million	Under construction
Description: Establishment of a small run-of-river hydro power plant (9.4MW) supplying electricity to the grid in the Atlantida region of Honduras; also entails upgrade of infrastructure for the local farmers (bridge, roads…)			
Indicate factors which led to project's success: Professionality of financing partners involved makes it possible to set up state of the art facility			
Technology transferred: small scale hydro technology			
Impact on greenhouse gas emissions/sinks (optional) 25 000 tonnes per annum			

Project/programme title: Proyecto de Desarrollo Estrategico de los Recursos Naturales en Ayacucho – Apurimac – Huancavelica – PRODERN I; N° PER0801511 – Strategische ontwikkeling van de natuurlijke hulpbronnen in de regio's Ayacucho – Apurimac – Huancavelica			
Purpose: The project operates in synergy with current and scheduled programmes supported by other donors that directly or indirectly support the environmental sector, so as to avoid duplication and foster effectiveness and efficiency. It was therefore decided to cooperate with the VMDERN (Deputy Ministry for Strategic Development of Natural Resources). The project focuses on institutional assistance combined with regional actions for land management, sustainable use of biodiversity and upgrading of natural resources and eco system services. The theme areas are categorised in accordance with the VMDERN's powers and in complementarity with other partners' projects and programmes. Long-term institutional assistance makes it possible to create the conditions for the Directorates-General (DG Land management, DG Evaluation, Assessment and Financing of Natural Resources and DG Biodiversity) to strengthen the cooperation with regional administrations and other ministries. At the end of the four-year project, the DGs involved should have built up an international leadership that is recognised at national, regional and local level. The project should enable the DGs and regional authorities to focus on a new approach encompassing the following: developing or adapting policy, plans or tools for land management, upgrading of natural resources and sustainable use of biodiversity in synergy with local stakeholders.			
Country:	**Sector:**	**Total Funding:**	**Years in operation:**
PERU	Environment	EUR 2 717 115 (EUR 2 610 000 Belgian contribution and EUR 107 115 national contribution	Since 2010

Description:
The programme's general objective is combating poverty, in tandem with an environment characterised by the sustainability of the natural heritage.

The specific goal of PRODERN is: the Ministry for the Environment (MINAM) and the regional authorities (GORE) conduct sound management of the natural heritage in the intervention zone.

There are four projected outcomes:
1. The regional government of Ayacucho and the local authority of the Cabana district develop the capacity to implement an Economic and Ecological Zone (ZEE) plan at micro level, through the experience of a pilot ZEE at micro level.
2. The MINAM and GORE develop the capacity to implement projects to upgrade the natural heritage.
3. The GORE and MINAM develop the capacity to implement projects for the management and sustainable use of biodiversity.
4. Information on strategic development of natural resources is distributed and used by policy makers at national and regional level.

Factors that have contributed to the success of the project:
The project has not yet been subject to an external assessment, but this is planned for November 2013. The project team has identified the following three factors as being key to success:

The integration of the Directorate General for Projects into the Ministry for the Environment (MINAM) has facilitated close cooperation and coordination with three important MINAM DGs: a) DG Planning (DGOT), b) DG Evaluation, Assessment and Financing of Natural Heritage and c) DG Biodiversity (DGDB).
The integration of field offices into the regional government of Apurimac, Ayacucho and Huancalevica permitted close cooperation with the DGs for Economic Development and Management of Natural Resources of the regional governments. There was a particular focus on developing and strengthening the institutional capacities of local and regional governments to foster the incorporation of protection of natural resources as a key component of sustainable development plans and their respective budgets.
Planning and implementing pilot projects in the field, focusing on micro-zoning and the restoration of river basins in the high mountains, facilitated the development and improvement of the local governments' capacities, in order to improve their prosperity and living conditions through the sustainable management of these mountain ecosystems and the goods and services they provide.

Technology Transferred:
The major skills and technologies improved and/or transferred are:

1. Improvement of the institutional capacity at national and sub-national level with the exchange of experience with other countries in the region on land management, the evaluation of eco-system services and goods and the sustainable management of biodiversity, by means of scholarships and work placements.
2. Capacity-building at all levels by means of micro-zoning pilot projects in the basins in the (high) mountain ranges selected jointly with the local and regional governments and local people.
3. Technologies for water management, pastures and forest in mountain regions, based on ancient knowledge and traditional practices, integrating modern methods and the use of indigenous species.
4. Restoration of terraces with irrigation systems, using traditional technologies, to improve the production system in the Andes communities.
5. Protection and evaluation of biodiversity in agriculture, i.e. indigenous potatoes and traditional Andes cereals.
6. Improvement of the genetic quality of traditional livestock in the high Andes.
7. Improvement of links with the market and strengthening of the value chain based on local agro-biodiversity products, with a certificate of biological origin and principles of responsible purchase and fair trade.

Project/programme title: Renewable Energy for Rural Development

Purpose: to promote rural development by providing access to energy: i.e. to increase access to hydraulic, solar and wind energy for use in off-grid installations in rural areas, by investments in renewable energy systems, stimulation of micro-finance initiatives and institutional capacity building.

Recipient Country:	Sector:	Total Funding:	Years in operation:
Mozambique	Power generation (23030 – OECD/ DAC)	EUR 15 000 000 (an additional EUR 9 000 000 is foreseen –Dutch contribution)	Start 2010 First TA in 2011

Description:
The project is part of the 2009-2012 Indicative Cooperation Programme (ICP), signed between Belgium and Mozambique in April 2008. The duration is 5 years.
The project is implemented by Fundo de Energia (FUNAE) and the Belgian Development Agency (BTC). It aligns with FUNAE's strategic plan and has three main components:

- Increase access to renewable energy in rural areas (solar, wind and hydro-projects): electrification of districts, administrative posts, school and health centres through photovoltaic systems; construction of small hydro or micro hydro pumping systems; construction of wind pumps
- Promote investment through micro-finance: set up and promotion of micro-finance mechanisms; investment funds.
- Support FUNAE through capacity building: institutional development and training.

Indicate factors which led to project's *"success"*:
After the MTR (February 2013) it appeared that the efficiency of the RERD project, measured as the achieved outputs related -via the activities- to the inputs, has up to now been low: tender process for PV and importation of equipment both suffer from serious delays; as for hydropower, currently there are 6 sites where feasibility studies were finalized, from which 5 are ready for tendering; one site is in the process of tendering; after evaluation of FUNAE wind pumping activities it was decided to halt the wind water pumping activity and start with wind resource assessment for selected off-grid areas instead; related to Micro-Finance: activities have not been efficient because they have been entangled in misconceptions; capacity building has been slow.

Technology to be transferred:
Hydro-electric power systems, solar(PV) panels

Impact on greenhouse gas emissions/sinks (optional)
No information

8. Research and systematic observation

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8.1. General policy

Institutionally speaking, Belgium is a ‘mini-Europe’, each of the federated authorities (regions and linguistic communities) is singularly competent for the areas of science, technology and innovation (STI) granted to it by the law. The long decentralisation process which began in the 1970s has led to a fascinating differentiation of institutions and policies adapted to the specific STI potential and the social and economic needs of each part of Belgium and its different entities (BRISTI, 2010).[55]

Belgium is a federal state consisting of seven autonomous entities: the Federal State, the three regions and the three communities. Each of these entities has its own competence with regard to scientific research within the framework of their respective competences, including implementing international or supranational agreements or instruments.

Since technology and innovation connect to the competence of economy, which is mainly a regional competence, and the scientific research in that respect, it is mainly the regions that are the competent authority for this. Fundamental research, usually conducted in universities and other higher education institutes is once again primarily a community competence, since the communities are the competent authority for education and educational institutions.

In addition to being the competent authority for scientific research within the scope of its own competence, the Federal Government retains exclusive competence for space research within the framework of international or supranational institutions and agreements and is the competent authority for the implementation and organisation of networking and the exchange of data between scientific institutions at national and international level. Provided a cooperation agreement is drawn up with the competent entities, it can also develop scientific programmes and operations that require a uniform implementation at national or international level. In addition to this, the Federal Government can also take the initiative for a range of scientific research that is normally the responsibility of the communities and regions, if it concerns scientific research within the framework of international or supranational agreements or acts which apply to Belgium as a treaty partner, or going beyond the interests of one community or region.

Both the communities and the Federal Government are ultimately responsible for a number of different public scientific institutions.

Various academies such as the *Académie royale des sciences, des lettres et des beaux-arts de Belgique*, Royal Flemish Academy of Belgium for Sciences and the

[55] http://www.belspo.be/belspo/home/publ/pub_ostc/BRISTI/Bristi_tome1_2010_en.pdf.

Arts and The Belgian Royal Academy of Medicine are mainly supporting structures responsible for the distribution of information on research and are subsidised by the various federal and federated entities. They are composed of high-ranking officials representing the Federal Government, the Communities and the Regions.

Cooperation, coordination and consultation, which form the basis for the formulation of decisions and positions related to research policy, are organised by the International Cooperation Commission (ICC) and the Federal Cooperation Commission (FCC), two permanent committees of the Interministerial Conference for Science Policy (IMCSP).

At the administrative level, both committees provide consultation on matters concerning the Federal Government and the subareas, at the international and Belgian level respectively, and are composed of high-ranking officials representing the federal state, the communities and regions. Decisions in the FCC-ICC are made on the basis of consensus of all parties. There are policy lines on climate research at each policy level, and climate-related research and observation activities are mainly carried out in universities and research institutes.

The distribution of responsibilities in STI across the various authorities in Belgium is based on fields of competences rather than on the actors. This is illustrated by the case of universities, mayor players in the Belgian research system. Whereas the Communities are competent for and fund research at all higher education institutions (HEI), both universities and university colleges, the Federal Government and the regions can also fund projects of HEIs for STI activities in their own realm of competences. Concretely, this means that HEIs may receive funds from the federal, regional or communities (according to their location and their linguistic regime but for different purposes and with different conditions attached to the finances received. (BRISTI, 2010)

This chapter will concentrate on describing the current policy objectives in the field of climate-related research for each of the authorities, the key players and measures, and looks ahead to the future orientation of the policy, especially in light of the Europe 2020 strategy of the European Commission, the implementation of the European area of research and the future European research & Innovation Plan. This chapter is a supplement and update to chapter 8 from the fifth national communication that expands more on institutional aspects of science policy and they are virtually unchanged.

8.2. Research

8.2.1. International cooperation

Climate-related research is a typical field for international cooperation. The reason for this is its transboundary nature, the complexity of the climate system and the impact of climate change and variation. This cooperation is related to various activities: research and observation as well as scientific assessment and integration. Belgium is active in all of these efforts.

At the European level, cooperation takes place by means of coordinating instruments for nationally funded research such as ERA-NETs (European networks of research funders and managers), COST (an intergovernmental framework for European cooperation in the field of research), ESFRI (European Strategic Forum on Research Infrastructures) and JPIs (Joint Programming Initiatives). The purpose is to increase the value of relevant national and European research and development (R&D) funding through coordinated and joint planning, implementation and evaluation of national research programmes. The JPI *Connecting Climate Change Knowledge for Europe* (JPI Climate), FACCE (*Agriculture, Food Security and Climate Change*) and *Urban Europe* are already operational, concentrating specifically on climate research. The FACCE JPI examines how sustainable agriculture can be developed while taking food safety and climate change into consideration. MACSUR is an example of this. JPI *Urban Europe* aims to reduce the ecological footprint of cities and to promote climate neutrality. JPI Climate wishes to contribute to the highly coordinated development of knowledge, not only by improving the scientific expertise on climate change, risks and adjustment options, but also by connecting this knowledge with decision-making on security and large investments in climate-sensitive sectors in Europe and the development of 'climate' services. Although the Joint Programming Initiative "Healthy and Productive Seas and Oceans" (JPI Oceans) has a wider scope than just climate issues, it will obviously also address the key role of the oceans in the climate and Earth system.

Within the framework of joint calls from these JPIs, selected projects are supported through the various funding agencies or aspects of the strategic research agendas of the JPIs are included in the national research programmes.

Besides the participation in these JPIs, Belgium is also a partner in the European research infrastructure project 'Integrated Carbon Observation System' (ICOS). The intended purpose of this infrastructure is to decipher the greenhouse gas balance, especially in Europe. ICOS will provide the long-term observations and the development of products required to understand the present state and predict future behaviour of the carbon cycle and to monitor the effectiveness of carbon sequestration and/or greenhouse gas emission reductions. It is also a contribution to the European share of the greenhouse gas observations within the framework of GEO, WMO-GAW and GTOs.

The infrastructure consists of a network of terrestrial, atmospheric and oceanic measuring stations, analytical laboratories, and thematic centres. A common data centre (Carbon Portal) provides free and easy-to-use access to ICOS data as well as web-based tools for the study of the sources and sinks. The data can serve to validate remote sensing products, for scientific assessments and for modelling.

The research group of Plant and Vegetation Ecology (PLECO) and the Centre of Excellence ECO of the University of Antwerp are the Focal Point for Belgium and are responsible for the Ecosystem Thematic Centre (ETC) in conjunction with the University of Tuscia (Viterbo, Italy) and INRA Bordeaux (Institut National de la Recherche Agronomique; Bordeaux, France).

There are three Ecosystem Stations in Flanders of which two (Brasschaat and Lochristi) are currently operational and the third station in Maasmechelen is under construction. The Hercules Foundation is providing 8.6 million euros over a six-year period (2013-2018) for the construction of the three terrestrial stations, one oceanographic station (RV Simon Stevin) and the Thematic Centre 'Ecosystems'. The research group 'Unit of Biosystem Physics' in Wallonia is responsible for three ecosystem stations (Vielsalm, Lonzée and La Robinette), which are funded from January 2013 for a period of 8 years. The ocean component of ICOS-Belgium currently consists of one research vessel, i.e. the Simon Stevin, which is managed by the Flanders Marine Institute (VLIZ). Action is currently undertaken to also include the federal research vessel Belgica (managed by BELSPO (Federal Public Planning Service for Science Policy) and the Royal Belgian Institute of Natural Sciences in cooperation with the Belgian Navy) into this infrastructure.

As part of the creation of the European Research Area, Belgian funding agencies participate in ERA-NETs, some of which are relevant to climate research. For instance, energy with possible links to climate issues is one of the themes of the current call of ERAfrica in 2013.

As part of COST, Belgian researchers participate in more than 30 on-going COST Actions in the field of 'Earth System Science and Environmental Management (ESSEM)'. Examples are: 'Towards a more complete assessment of the impact of solar variability on the Earth's climate', 'Advanced Global Navigation Satellite Systems tropospheric products for monitoring severe weather events and climate' (GNSS4SWEC), 'Assessment of European Agriculture, water use and trade under climate change' (EURO-AGRIWAT), 'Basic Concepts for Convection Parameterization in Weather Forecast and Climate Models', etc.

Belgian teams are particularly active, within the 7th European Framework Programme for Research and Technological Development, in i.e. 'Estimating the future contribution of continental ice to sea-level rise' (ICE2SEA). 'The terrestrial Carbon cycle under Climate Variability and Extremes a Pan-European synthesis' (CARBO-Extreme), 'Comprehensive Modelling of the Earth system for better climate prediction and projection' (COMBINE), 'Reducing Emissions from Deforestation and Degradation through Alternative Land uses in Rainforests of the Tropics' (REDD-ALERT)… Model improvements for reliable projections of the future climate (EMBRACE), Climate Change: Learning from the past climate (PAST4FUTURE) and many other projects.

In addition to this, a large number of research institutes and universities are represented in a number of joint programmes belonging to the 'European Energy Research Alliance' (EERA) that cluster scientific institutes and universities around technology and policy issues from the Strategic Energy Technology Plan (SET Plan).

Belgium is significantly signed up to the SET Plan. The aim of the SET Plan is to accelerate the development and deployment of low-carbon technologies in order to achieve the ambitious 20-20-20 objectives and to put Europe well on the way to a real low-carbon economy by 2050 with an 80-95% reduction of greenhouse gas emissions. It is therefore considered as the key technology pillar of the European energy and climate policy. The SET Plan is the pioneer in the sphere of an effective coordinated approach for all European Member States in the field of energy technology. As part of the SET Plan, Flanders and Wallonia participate in the Solar ERA-NET and ERA-NET Plus European Wind Atlas. Flanders also participates in the Ocean Energy ERA-NET within the same framework.

Belgium is also a member, via BELSPO, to the *Energy Technology Systems Analysis Programme, an* Implementing Agreement of the International Energy Agency (IEA-ETSAP). The research teams involved (VITO - KULeuven) cooperate on maintaining and developing a family of 4E models (energy/economy/environment/engineering) with a view to providing long-term energy scenarios and energy and environmental analysis at national, regional (multi-country) or global level.

International climate-related research programmes that Belgian scientists participate in include (incomplete list):

- the International Geosphere-Biosphere Programme (IGBP), in particular the core projects SOLAS (*Surface-Ocean-Lower Atmosphere Study*), PAGES (*Past Global Changes*) in particular Regional (Ocean and Africa) 2K initiative.
- *the World Climate Research Programme (WCRP):* in particular, Climate Variability and Predictability (CLIVAR and EUROCLIVAR),

the *Arctic Climate System Study* (ACSYS), *Climate and Cryosphere* (CLIC), and *Stratospheric Processes and their Role in Climate* (SPARC)

- *the European Network for Earth System Modelling* (ENES).

8.2.1.1. Federal Government

Federal Public Planning Service for Science Policy (BELSPO) is the fifth largest contributor to the research programmes of the European Space Agency and participates in almost all ESA programmes. The ESA climate-related programmes are the 'space weather' programme and the Earth observation programme. BELSPO actively participates in both programmes and also provides significant contributions to international Earth observation programmes such as GEO, ESA, EUMETSAT, ECMWF, GMES, etc. of which partial aspects are relevant to climate.

BELSPO funded bilateral projects with Vietnam and China within the bilateral cooperation scheme. These projects address the impact of climate change, land use and desertification, and the development of models for the management of fish stocks in relation to climate change as regards Vietnam and the impact of biogenic emissions for China. Details about these projects can be found on: http://www.belspo.be/belspo/fedra/prog.asp?l=en&COD=BL

From 2012 onwards the bilateral cooperation scheme focuses on the topping up of networking with a view to a long-term structural cooperation. Climate change is a theme that can be addressed in a joint call funded by both: BELSPO and the bilateral partner.

The first call resulted in a joint project with Burundi on the exploitation of observations for climate applications and improving research within the framework of the cooperation instrument 'Networking with Federal Scientific Institutions (FSIs)', an instrument for the FSIs to exchange knowledge, ideas, experiences and researchers with third countries.

BELSPO acts as a focal point for the Intergovernmental Panel on Climate Change (IPCC), and stimulates scientists and experts to participate actively in IPCC activities as author or reviewer or to contribute to establishing a Belgian position. In particular, it finances a technical and scientific support team to help Prof Jean-Pascal van Ypersele, IPCC Vice-Chair.

As part of Belgian participation in the JPI-climate, the secretariat of this JPI will be hosted by BELSPO and a budget will be provided by both BELSPO and the Research Foundation-Flanders for the first joint JPI climate call.

The BELSPO research programmes such as 'Science for a Sustainable Development' (SSD) and BRAIN-be 'Belgian Research Action through Interdisciplinary Networks', that deal with climate-related themes are open to the participation of foreign research teams.

At the federal level, there is also a research and development programme for all industrial developments necessary for the purpose of aircraft developed by Airbus. A considerable amount of this research is directed towards 'green' aircraft: lower emissions, less noise.

Policy related to the nuclear sector, the nuclear fuel cycle and nuclear R&D is the exclusive responsibility of the Belgian Federal Government. Although deciding to phase out the production of electricity by nuclear fission energy, the Belgian government acknowledges the importance of investing in nuclear research to support the safe operation of nuclear power plants in Belgium and in Europe, the development of sustainable solutions for the management of radioactive waste and the future decommissioning and dismantling of nuclear power plants. The Belgian Nuclear Research Centre (SCK•CEN) is developing the multipurpose nuclear research facility MYRRHA, identified within the European ESFRI roadmap and within the European Sustainable Nuclear Industrial Initiative (ESNII) of the Sustainable Nuclear Energy Technology Platform (SNETP) in support of the SET-Plan. As member state of the European Union's Joint Undertaking for the international organisation ITER and the Development of Fusion Energy, Belgium also contributes to the development of fusion energy which aims to start producing carbon-free electricity in 2050.

8.2.1.2. Wallonia

In the wake of adoption in 1996 of the action plan, "Preparing Wallonia for the Future", the Government of Wallonia has steered its efforts towards clear identification of technological niches with all the stakeholders concerned.

A few examples of European projects are listed below:

– Regions of Knowledge (RoK) SCOT (Smart CO_2 Transformation): aims at making a major contribution to the development of an economy based on recycling of CO_2, with residual waste close to zero. In the context of a Life-Cycle Assessment (LCA), the consortium aims to promote research and innovation for the development of CO_2 recycling technologies and services avoiding the disposal of wastes.

– ERA-NET on Solar Electricity for the Implementation of the Solar Europe Industry Initiative.

– European Regional Development Fund (ERDF) projects:
  - SOLINDUS: aims to improve the treatment of dredging spoils;
  - WALEXTRACT: permits the extraction of natural preservatives from Walloon forestry products;
  - TECHNOPOLY: studies the recycling of plastic waste;

- SINOPLISS: develops knowledge in the area of creating value from biomass and bioplastics.

Wallonia (through Belgium) has been member since 1990 of the International Energy Agency (IEA) implementing agreements (IAs). The main IAs are: 'Energy Conservation and Emissions Reduction in Combustion' (ECERC), 'Energy Conservation in Building and Community Systems' (ECBCS) and 'Solar Heating and Cooling' (SHC). The Walloon Region has also financed, in collaboration with the other regions, the participation of the Scientific and Technical Centre for the Construction Industry (CSTC/WTCB) in the "Hybrid Ventilation" annex of the IEA's ECBCS Implementing Agreement. As part of the SET plan, Wallonia participates in particular in Solar-ERA-NET and ERA-NET Plus European Wind Atlas.

Several projects have been funded in the area of developing the value of sustainable energy and rational use of energy.

8.2.1.3. The Flemish region

The preparation and evaluation of national and international policy in the field of economic support, science and innovation in Flanders is the responsibility of the Department of Economy, Science and Innovation (EWI). EWI, together with the Agency for Innovation by Science and Technology (IWT), the Research Foundation – Flanders (FWO) and the Hercules Foundation (financing of infrastructure) is involved in several research programmes and networks on climate-related issues, such as ERA-NETs (Eco-innovera, Transport 'future traveling', etc.), the Joint Technology Initiative Fuel Cell and Hydrogen (FCH), ESFRI, JPIs, KICs (Knowledge and Innovation Communities),…

VITO (Flemish Institute for Technological Research) is a strategic research centre set up to facilitate the transition to a more sustainable industry and reduced dependence on fossil fuels. VITO has already taken a leading position in Flanders in the field of energy innovation in the metropolitan area through the joint initiative EnergyVille, by coordinating a number of Flemish breakthrough projects (e.g., LINEAR). Additionally, with KIC InnoEnergy from the European Institute of Innovation and Technology (EIT), it takes a first step towards realising a prestigious European centre of knowledge. In this it is indeed recognised as the European node of 'Intelligent and energy efficient cities and buildings' and collaborates with more than 25 European partners, including a number of important industrial players (for example, Total, EDF, ABB, EANDIS and Vattenfall). Furthermore, as initiator, chairman and part of BERA (Belgian Energy Research Alliance) VITO plays an important role in the EERA (European Energy Research Alliance), both as representative of BERA in the EERA ExCo and as a participant in various EERA Joint Programmes such as JP Smart grids, JP Smart Cities, JP Geothermal Energy, JP Energy Storage and JP Economic, Environmental and Social Impacts of Energy Policies and Technologies.

VITO is also partner in the European Topic Centre for Air Pollution and Climate Change Mitigation supporting the European Environment Agency on numerous environmental and greenhouse gas related topics. VITO is initiator of, or is otherwise involved in, a large number of projects on smart grids, smart cities and the transition within the 7th European Framework Programme for Research and Technological Development (FP7): LINEAR, S3C (Smart Consumer – Smart Customer – Smart Citizen), STEP UP, ARTS.

Flanders is one of the coordinators of JPI Oceans, which examines, among other things, the impact of human activities and climate change on oceans. The new Flemish research vessel 'Simon Stevin', that will conduct marine research, was christened in 2012. The department of economy, science and innovation (EWI) finances and manages the Flemish Trust Fund to support UNESCO's scientific activities (FUST – The Flanders UNESCO Science Trust Fund). Issues such as the water needs in areas under pressure as a result of climate change are examined through UNESCO's International Hydrological Programme (IHP). The Flemish Environment Agency (VMM) actively participates in a number of Interreg projects around the theme 'water'. Solutions to the flooding problems are sought in EU project *FloodResilienCity*. VMM and VITO work in the WEISS project on the mapping out (analysis) and reporting of water quality. VMM also coordinates the Interreg project Joaquin (Joint Air Quality Initiative), which deals with air pollution, and it invests within this European project in equipment for measuring ultrafine particles.

As part of the ESFRI project 'ANAEE' (Infrastructure for Analysis and Experimentation on Ecosystems) Flanders is investing 3.2 million euros in the development of an ecotron[56] to analyse the effects of climate change on ecosystems and organisms.

8.2.1.4. Brussels-Capital Region

The Regional Innovation Plan 2007-2013 updated in 2012 to cover the period 2013-2020 identifies the Environment as one of three priority pillars for the Brussels research. In this context, the region has encouraged funded through its measures to support the development of transnational research projects positive climate impact.

To encourage the participation of Brussels-based players in various European or international research programmes, aid is now available to SMEs, universities and research bodies that wish to implement an "International Partnerships" project. Through this initiative, INNOVIRIS is funding the

[56] Ecotrons are highly instrumented research platforms designed for ecosystem research under confined, controlled environment and replicated conditions which allow for manipulation and measurements of complex ecological processes

preparation, negotiation and submission of R&D projects involving one or more participants from Brussels with one or more foreign entities in the context of European R&D programmes. Since the creation of this support measure in 2011, INNOVIRIS has financed the preparation of two projects in the area of climate change mitigation through the development of renewable energy. The first concerned the performances of photovoltaic installations and the second focused on the development of wind turbines for urban areas.

The Brussels Enterprise Agency (BEA) serves as the national contact point (NCP) for research and development projects in the framework of FP7 and its Competitiveness and Innovation programme (CIP). In 2012, for example, the BEA supported the development of two projects aiming to improve energy efficiency and reduce greenhouse gas emissions on a large scale in an urban environment (SALIENT and BePixie).

The BEA also operates the Green Tech centre (www.brusselsgreentech.be/en) and is involved in several environment and climate change projects, such as the ERDF "BSE" project to draw up and implement a strategic plan for the development of six economic sectors in the field of the environment (eco-construction, renewable energy, green chemicals and green and white biotechnologies, water, waste, and sustainable food supply), and the transnational GreenOV project (www.greenov.net) for sustainable renovation of existing buildings.

8.2.2. Domestic activities

8.2.2.1. Federal research programmes and activities

The administrative structure responsible for the implementations of the federal science policy is the Federal Public Planning Service for Science Policy (BELSPO), which falls under the authority of the State Secretary for Science Policy. An important basis of the federal science policy for the coming years is the management agreement recently drawn up between the Chairman of BELSPO and the Minister responsible at the time. The agreement pays a great deal of attention to climate change issues. The development of reference expertise, particularly in the field of climate within the federal scientific institutions, is one of the focus areas.

Expertise platform on climate scenarios

At the present time there are three common types of climate scenarios in Belgium: the one developed by the Royal Meteorological Institute (RMI) with the high resolution model ALADIN, the one developed with Prudence RCMS within the framework of the SSD project CChydr, and the one developed with COSMO Climate Limited area Modelling (CCLM) within the framework of the SSD project MACCBET.

The new scenarios used in the IPCC AR5 and based on RCPs, the need for additional downscaling steps and uncertainty analysis (statistical and stochastic methods) of models used for impact analysis and adaptation and the development of climate services are issues not yet taken into account by the three climate scenarios mentioned above. A newly setup expertise platform on climate scenarios will direct the development of coherent climate scenarios and develop a 'forward looking approach' as regards the scenario and model development needs in the future. This important development prepares the way for the development of a more service-oriented environment.

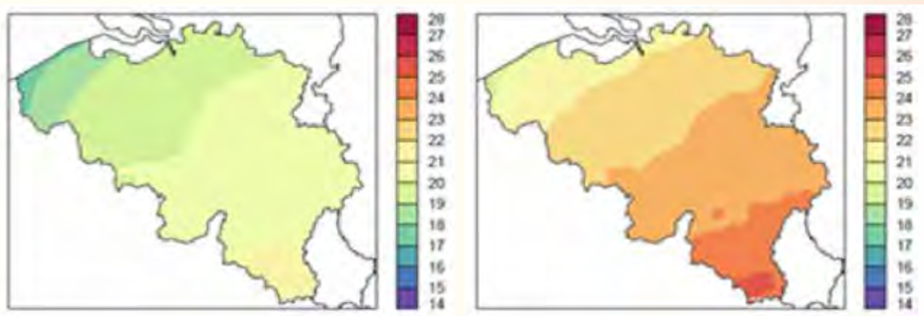
Framework - illustration

In 2011 the Royal Meteorological Institute started to compute regional climate scenario runs for Belgium using the ALARO model. Since 2011 the RMI has started to use this model to compute Belgian scenarios. The ALARO model has been thoroughly validated for heat waves and extreme precipitation over past periods. It will be used to study the local climate impact for these extreme events.

Currently results have been produced for the old A1B IPCC scenario. The global scale input of the regional model was taken from the output of the global CRNM model climate runs of Météo France that were reported in the IPCC Fourth Assessment Report. Figure 8.1 shows an example of the consequence of the warming in Belgium under this scenario.

The climate model has been used to study the impact of climate change on the exacerbation of heat waves occurrences,

Figure 8.1 Global Warming for Belgium, computed with the ALARO-climate model of the Royal meteorological Institute: mean summer temperature (in degrees Celsius) for the years 1961-1990 (left panel), and for the period 20171-2100 (right panel), under the A1B IPCC scenario.



felt in the Brussels Capital Region, under influence of the urban heat island (UHI) effect. This study shows that under this A1B scenario one can expect roughly an increase of 40 to 50 more cases of heat waves over a span of 30 summers between 2071 and 2100 compared to the occurrence in the present-day climate. As an interesting observation in this study it was found that the large Forêt de Soignes/Zoniënwoud in the Brussels-Capital Region has a beneficial effect in mitigating the effect of the warming.

An important application of regional climate models is the assessment of the impact climate change has on society based on projections drawn up by the IPCC. An initial study was conducted and it showed the advantages of a higher resolution model within the context of the simulation of heat waves in the twentieth century.

At the request of the provinces of East and West Flanders, a climate atlas was set up providing information on expected climate change during the next century. (see figure 8.1)

Federal reference centre of climate expertise

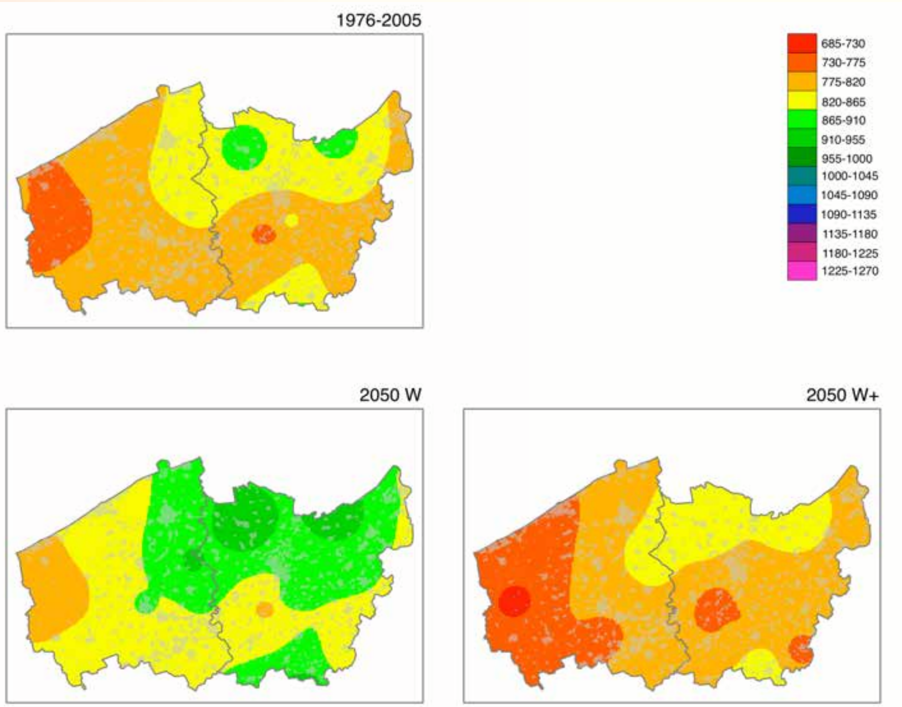
Within several federal scientific institutions (the RMI, the BIRA-IASB, the ROB, the RMCA and the RBINS) belonging to the Belgian Federal Science Policy Office, there is significant, yet very fragmented expertise available as regards climate-related research and services. Moreover, these institutions have a great deal of climate-related observations at their disposal; these include those made in Belgium, Africa and Antarctica: recurring measurements of essential climate variables and other.

With a view to the development of new strategies, adequate critical mass to allow each federal institution to be a key player at the international level in relation to climate research and to strengthen the synergies between the institutions, to eliminate overlaps in research activities and to pool the expertise that is necessary in order to respond to the pressing questions posed by society on the issues of climate change, a federal reference centre of expertise is to be developed. A working group made of representatives of the five above mentioned federal institutions has been appointed. A study will serve to formulate proposals on the possible structure and operation of this centre, as well as a roadmap for its implementation.

Science for Sustainable Development (SSD) Programme (2005-2009-extended)

The Science for Sustainable Development (SSD) Programme, 2005-2009, described in the fifth national communication, resulted in a series of final reports on projects related to the knowledge about the climate system and the underlying processes (AGACC, BIOSOL, IBOOT, PEACE, BELCANTO, HOLANT, ASPI, etc.), the modelling of the climate system (ASTER, PREDANTAR, etc.), the impact of climate change (CLIMAR, CCI-HYDR, etc.) and projects to support policy: mitigation and adaptation (ADAPT, BE-REDD, ABC-impact, BOREAS, CLIMNEG III, etc.). The SSD programme was enlarged by two additional calls. The first was focused on research as scientific basis for better projections of climate change at short notice and on the regional (Europe, Africa) scale. The selected projects concern research into biogeochemical cycles (BIGSOUTH), the role of atmospheric chemistry (BIOSOA, AGACC2), the development of a regional climate model for Belgium (MACCBET) and a model for better climate and sea level projections during the present century and the next Millennium (iCLIPS).

Figure 8.2 Maps showing average annual precipitation (in mm) for the current climate (upper left for 1976-2005) and for around 2050 based on the W- scenario (lower left) and the W+ scenario (lower right).



Issues addressed in the second call included the management of natural hazards in Belgium and Central Africa and resulted in, among other things, projects concentrating on a tool for decision-making in relationship to the risks extreme weather conditions pose for forest ecosystems in Belgium (ECORISK), the impact of extreme weather conditions on agro-ecosystems (MERINOVA), the impact of drought on groundwater (GroWaDRrisk) and models concerning the risks of flooding (PLURISK).

All of these SSD projects are multidisciplinary network projects involving several research teams. The average magnitude of the projects amounts to approximately 1 million euros.

For further information about these projects and the final reports of completed projects, see the section on sustainable development on the BELSPO website: www.belspo.be/ssd/.

A number of projects relating to the Antarctic climate system are supported within the framework of support provided to the Belgian Prince Elisabeth Antarctica Station.

BRAIN-BE

On 5 October 2012, the Council of Ministers gave its approval for the launch of the first phase (2012-2017) of the recurrent research programme BRAIN-BE (Belgian Research Action through Interdisciplinary Networks). The programme is set up around six thematic axes:

- Ecosystems, biodiversity, evolution
- Geosystems, universe and climate
- Cultural, historical and scientific heritage
- federal public Strategies
- major societal challenges
- management of collections

It supports the financing of both multidisciplinary, multi-year network projects (4 years) and pioneering projects lasting a maximum of two years. This framework programme allows through the funding of research projects based on scientific excellence and European and international anchorage to meet the needs for scientific knowledge of the federal departments and to support the scientific potential of the Federal Scientific Institutions.

Various aspects of climate-related research can in principle occur within the different axes. The understanding and modelling of the climate system and the scientific substantiation of climate services and development of policy support tools will be given considerable attention in axis 2. The research agenda is directed primarily towards the Strategic Research Agenda of the *Joint Programming Initiative Connecting Climate Change Knowledge for Europe* (JPI-Climate). Transition to a low-carbon society is discussed in axis 5 'Important social challenges'. The Federal Science Policy Office published the first two calls in 2013. The selection procedure of the first call (axes 2, 3 and 5) resulted in 4 climate-relevant network projects: PAMAXEA aims to improve understanding of climate trends and extremes and their impact on water availability in East Africa, as basis for appropriate management; STOCHLIM aims to improve the understanding and description of the main physical processes in climate models, especially the hydrological cycle; MASC will study the feedback between climate change and land surface changes to improve regional climate models for Belgium and Western Europe and Food4sustainability concerns the reform of food systems to create more sustainability which is essential for a transition to a low carbon society.

The two selected pioneering projects involve the prediction of sun activity (PREDISOL) and innovative measuring techniques with an unmanned aircraft to calibrate the observations within the framework of the *Total Carbon Column Observing Network* (TCCON).

The results of the second Brain-Be call up will be available early 2014.

For detailed information on BRAIN-BE and these projects: http://www.belspo.be/brain-be/

Remote-sensing research programmes and activities

There are a number of up and running climate-relevant projects, also within the STEREO II research programme, these include: Earth Observation to support Agricultural Damages Assessment System in Crop Insurance Schemes (ADASCIS) and Flood mapping and soil moisture retrieval for improved water management (FLOODMOIST).

For detailed information on STEREO and these projects: http://www.belspo.be/belspo/space/telsat_nl.stm.

Research infrastructures

Through space programmes that are (partly) funded by BELSPO, all kinds of infrastructure such as instruments, satellites and ground stations, is available to researchers. Thanks to Belgium's extensive participation in ESA and EUMETSAT, researchers can also use data from operational and scientific satellite missions such as METEOSAT, MSG, MTG, METOP, ENVISAT, ERS, EARTH EXPLORERS, SENTINELS, etc.

8.2.2.2. Wallonia

In Wallonia, science, technology and innovation (STI) are managed by several directorates general of the Walloon Public Service (SPW). The Walloon Region primarily finances research, development and innovation activities with a view to developing economic and industrial activity, as well as research aimed at developing specific expertise in its areas of competence. The Operational Directorate-General for the Economy, Employment and Research (DGO6) has primary responsibility for drafting and implementing policy, through its Competitiveness and Innovation, Technological Development and Research Programmes departments.

Other ministries also have responsibilities for financing research activities in their respective areas of competence. They are completely independent in developing such activities.

Other SPW operational directorates general manage smaller budgets and actions to support STI activities in their particular areas of competence: natural resources and the environment, social and health programmes, town and country planning, equipment and transport, energy efficiency, sustainable energy and buildings, etc.

Research participants are mainly companies, universities, higher education institutes, research centres and public research bodies.

For more information on:

– Research in Wallonia, see http://recherche-technologie.wallonie.be
– The environment in Wallonia, see http://environnement.wallonie.be
– Energy in Wallonia, see http://energie.wallonie.be/

Specific research on energy

The Walloon budget for energy-related research and development currently stands at around 30 million EUR a year. According to the IEA classification, the average main research areas are energy conservation (46%) and renewable energy (28%), followed by electricity generation and storage technologies (12%).

In the framework of so-called "Mobilising Programmes", Wallonia regularly issues calls for proposals to companies and universities for research projects on specific thematic priorities, the results of which may be of interest over the longer term for industrial and economic growth. Programmes financed recently in the area of non-nuclear energy include:

- ERable 2011: research on energy efficiency and renewable energy
- RELIABLE: research on smart and sustainable electricity grids. Various research projects are also financed to examine specific elements or to produce scientific and technical findings in the construction sector.

Other sectors

Wallonia's competence in the field of research and development concerns the application of findings on an industrial scale. The action plan "Preparing Wallonia for the Future", adopted in 1996, reflects the R&D strategy that the Walloon government wishes to promote through the Operational Directorate for the Economy, Employment and Research. Since the plan's adoption, the Walloon government's efforts have focused on clear identification of technological niches, defined with all stakeholders concerned.

Other programmes funded by the Walloon Region:

The "FIRST" programmes (Training and Impetus for Scientific and Technological Research): these give researchers the opportunity to get a taste of industrial experience while remaining attached to a university, through a targeted research project that can impact the Walloon Region's economic development.

The "Excellence" programmes: these are divided into university programmes and public/private partnerships. Launched by the Walloon Region, they aim to cover all issues related to research and innovation.

The Marshall Plan: this plan brings together universities, companies, and training centres on subjects related to industrial development, embodied in five so-called "competitiveness poles" (Skywin, Biowin, Wagralim, Mecatech and Logistics Wallonia). In this context, "mobilising programmes" constitute an essential instrument for funding industrial research in research units based in universities or higher education institutes, public research institutes or certified research centres. The Marshall Plan 2.0, while maintaining the orientation of its predecessor (competitiveness poles), aims to identify better ways to manage the challenges of the future (climate change, energy crises, etc.).

It is important to note that all projects selected must include an environmental perspective.

The Walloon Air and Climate Agency (AWAC) has initiated scientific studies more directly related to implementing policy and measures. Key recent projects addressing these aspects are: "Provision of information enabling Belgium to meet its reporting obligations on GHG emissions by source and carbon sequestration associated with the LULUCF sector with a view to meeting its obligations under the Kyoto Protocol and the UNFCCC" (2009-2011) and "Adaptation to climate change in the Walloon Region - Report on climate projections" (2011). The AWAC, together with BELSPO also contributed to the funding of a scientific seminar held in Brussels to review current scientific knowledge on the carbon cycle and gaps in this knowledge (*Exploring knowledge gaps along the global carbon route: a hitchhiker's guide for a boundless cycle, 4th-7th October, 2011*). This seminar resulted in a publication in the journal "Nature" http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo1830.html

The Standing Conference on Spatial Development (CPDT), created on 7 May 1998 by the Walloon Government, is a multidisciplinary platform of around 50 researchers from the three major French-language universities.

Its responsibilities include:

- research (doctoral chair, tracking and research offering decision-support tools for the Walloon government)

- training (of consultants in municipal land use planning)
- communication (dissemination of the CPDT's work to academics and national and international players involved in spatial development).

The research topics privileged by the CPDT are climate and energy, local and supra-local spatial development, economy and territory, mobility, land use and spatial changes, the natural heritage, landscape, strategic planning and land policy.

For additional information, see http://cpdt.wallonie.be

The AWAC has also financed a number of studies on projections for emissions of CO_2, CH_4, and N_2O using EPM micro-economic models developed by ECONOTEC.

8.2.2.3. Wallonia-Brussels Federation (ex-French Community)

In the Wallonia-Brussels Federation, the Minister for Childhood, Research and Civil Service is the authority with primary responsibility for STI policy for the federated entity. The other Ministers of the Wallonia-Brussels Federation are in charge of a limited portfolio of programmes in the context of their specific area of competence. The administration in charge of developing and implementing science policy is the Directorate for Scientific Research. The responsibilities of this administration include the financing of universities and higher education institutes that promote basic research (FRS-FNRS), development of concerted research actions (ARCs) and training in industrial and agricultural research (FRIA). In practice, the Fund for Scientific Research (FRS-FNRS) is the lead financing and management body. It finances basic non-oriented research based on a bottom-up approach. Research subjects are classified by research discipline rather than thematically. Climate research is classified primarily under the "Earth Sciences" and "Exact Sciences" headings.

Research financed in this context is linked to education and is therefore non-oriented. Different instruments are managed independently by the universities themselves (grouped into "Academies"), but the main budget is provided by the FRS-FNRS. For example: FRS-FNRS funding from 2010 concerns 2 962 items, with two listed in the "carbon assessment" category ('Bilan carbone' in French) and 35 in "climate and climate change". The latter category covers research in glaciology, spectrometry, modelling and plant physiology.

The FRIA, under the responsibility of the FRS-FNRS, provides research grants for more applied topics. Other financing bodies involved are the Interuniversity Institute of Nuclear Sciences (IISN), the Medical Science Research Fund (FRSM) and the Collective Investigator-driven Fundamental Research Fund (FRFC).

The Wallonia-Brussels Federation, via the ARC programme (concerted research actions) finances the principal research projects in the field of climate. The main subjects covered are water resources and biogeochemical cycles that influence CO_2 in the atmosphere.

8.2.2.4. The Flemish Government (Region and Community)

Most climate research takes place in universities and research institutes. The Department of Education and Training provides universities with research subsidies on the basis of both a direct and non-competitive approach as well as on a competitive basis. In the latter case, the most important subsidy sources are the Research Foundation-Flanders (FWO), the Special Research Fund (BOF), and two instruments of the IWT: doctoral scholarships at academic level and the Strategic Basic Research Programme (SBO), which aims to support top-level research projects conducted at Flemish universities and public research institutes.

Various Flemish research centres conduct climate research: the Flemish Information Centre for Agriculture and Horticulture (VILT) for agriculture, the Institute for Nature and Forest Research (INBO) for forestry, and the Institute for Agricultural and Fisheries Research (ILVO) for fisheries and agriculture. The study by VITO (Flemish Institute for Technological Research) concentrates on innovative technology that supports the transition to a more sustainable industry. VITO also develops instruments to facilitate better management of the environment and improve quality of life.

Although the Flemish science and innovation policy is based on a bottom-up approach, there are also thematic priorities defined by the Government.

The Flemish government is working towards putting Flanders on the map as an economically innovative, sustainable and caring society by 2020. Through the future project 'Flanders in Action' a number of objectives for 'grand societal challenges' are formulated. By making the link to existing scientific and technological strengths in Flanders, six multidisciplinary innovation hubs have been identified, namely transformation through innovation, eco-innovation, green energy, healthcare innovation, sustainable mobility and logistics, and social innovation.

Eco-innovation

In order to achieve sustainable growth, Flanders will continue to work on the development of environmentally friendly technologies and innovation. The Environmental & Energy Technology Innovation Platform (MIP) was launched in 2005 and its principal objective is the 'greening' of the economy, encouraging companies to invest in new products, processes and services that reduce the impact on the environment. With this in mind, MIP supports the development of new technologies for the generation of smart energy and endorses the 'Cradle to Cradle' philosophy in which material and processes comply with closed loop recycling as much as possible. The transition to sustainable materials management is also supported by Plan C. An efficient and sustainable management of waste and use of resources plays a central role in this. An notable initiative in this context is SYMBIOSE, in which businesses are brought together to examine whether materials considered being waste in one company can be put to good use as raw material at another company.

The reorientation of existing government instruments also contributes to a greener economy. IWT Flanders provides a subsidy allowance of 10% for research and innovation projects focussed on Sustainable Technological Development. Moreover, the venture capital company Flanders (PMV) invests in the development and implementation of environmentally friendly and energy-efficient systems, sustainable logistics, green and white biotechnology and sustainable energy production and consumption. The founding of i-Cleantech Flanders offers supports to the cleantech sector in Flanders by accelerating and simplifying the development of new technologies and systems.

Green energy

A number of initiatives have already been taken to support the transition to energy efficiency and renewable energy. The Flemish Energy Agency (VEB) was founded in early 2012 by the Flemish Government and is committed to the conservation and rational use of energy. In addition to this, environmentally friendly and decentralised energy production and supply are supported. The Flemish Energy Agency uses an investment fund to encourage the private market to get more involved in energy efficiency and renewable energy.

The knowledge centre Energyville arose from collaboration between KULeuven, VITO and IMEC, and performs innovative energy research focused on intelligent energy networks and energy-efficient buildings. The founding of smart grids Flanders, a platform of and for all companies and organisations involved in the development of smart energy networks, contributes to further pooling of expertise. In recent years and within the context of 'Generations', the Flemish innovation partnership of industry and knowledge institutions in renewable energy, a number of strategic infrastructure projects have been set up. The Flemish Photovoltaic Initiative focuses on strategic investments that strengthen and expand the Flemish R&D capacity in the field of solar energy; the Flemish Offshore Wind Infrastructure project is a test and monitoring infrastructure for offshore wind energy; the Linear project is a large-scale Smart Grids demonstration project in a residential environment that focuses on active demand management.

Sustainable mobility and logistics

The transition to long-term sustainable mobility is one of the Flemish Government's priorities. Strategic projects such as Flanders Logistics, VIL (Flanders Institute for Logistics), VIM (Flemish Institute for Mobility) and Flanders Drive were launched for this purpose in conjunction with the logistics sector and industry, aiming to make the transformation to a green and smart mobility industry. The Flemish Government has also invested 16.25 MEUR in the setting up of five platforms for test bed experimental electric vehicles, supported by the *Programme Office* from VITO. The experimental pilot area provides a structured testing environment in which companies or organisation have the opportunity to test innovative technologies, products, services and concepts. The ultimate goal of this test environment is to stimulate innovation, to perceive future needs and to encourage the use of electric vehicles.

Climate scenarios, state and impact of climate change

In a research assignment for the Flemish Region at the end of 2009, the KU-Leuven, the University of Ghent and the Flanders Hydraulic Research pooled the existing climate accounts for Flanders and Belgium as an approach to the Environment Outlook 2030 by MIRA/VMM. The scenarios derived (wet, moderate, dry) shed light on the climate change possibly awaiting us at the beginning and end of the 21st century. The potential impact on water management in Flanders is also quantified in the process.

The Flemish Environment Agency is planning an update and refinement of the climate scenarios for Flanders, to take place around the end of 2014 and to be based on recent scientific material supplemented by additional model runs, data analysis, etc.

It starts with the RCP scenarios taken from the 5th Assessment Report from IPCC. The focus of the new research report will be on shifts in the nature and the occurrence of both average and extreme weather phenomena (temperature, precipitation, etc.) and the impact of climate change on the marine climate (sea level, wave height, storm surge, etc.).

Additionally, an overview is made of the potential impact in Flanders of new/additional risk factors or 'tipping points' in the climate system.

Various climate change research projects based on the Flanders Environment Report have also been carried out in the past. Some of these are (only available in Dutch):

- 'Ready for what's coming? About the introduction of the climate adaptation policy in Flanders' (2011) (http://www.milieurapport.be/nl/feitencijfers/MIRA-T/milieuthemas/klimaatverandering)
- 'Impact on people and economy as a result of flooding seen from the angle of changing hydraulic conditions, environmental factors and climatic circumstances'. (2006): http://www.milieurapport.be/nl/feitencijfers/MIRA-T/milieuthemas/klimaatverandering/

- Research report ‘Analysis energy data and CO_2-emissions under the European Emissions trading system (ETS) in comparison with total energy consumption and CO_2-emissions in Flanders’. (2010): (http://www.milieurapport.be/nl/feitencijfers/MIRA-T/milieuthemas/klimaatverandering/)

Other reports, such as the scenario reports MIRA-S 2000 (2000) and the Environment Outlook 2030 (2009) explored the possible emission scenarios in relationship to both changed and unchanged policies. (http://www.milieurapport.be/nl/publicaties/MIRA-S2000/)

Finally, a research assignment at MIRA/VMM is directed towards mapping out the Urban Heat Island effect in Flanders. The end result of this study is expected by the end of 2014 and is based both on in situ observations and satellite images. The possible evolution of the heat island phenomenon at the end of the 21st century is also being assessed.

8.2.2.5. Brussels-Capital Region

Scientific research in the Brussels-Capital Region, under the auspices of the Ministry for Research, is the responsibility of the Brussels Institute for Research and Innovation (INNOVIRIS), created by a decree of 26 June 2003. This institute is tasked with financing scientific research and technological innovation in the Region’s companies, universities and higher education institutes. INNOVIRIS is also in charge of intergovernmental cooperation programmes such as EUROSTARS, EUREKA and JPI URBAN EUROPE. The non-profit organisation Research in Brussels (RIB) is in charge of activities aimed at popularising scientific research in the Brussels-Capital Region.

Other administrations, such as Brussels Environment (IBGE/BIM) and the Administration of Equipment and Transport (AED), finance isolated studies directed primarily at developing and assessing their policies. The Brussels Enterprise Agency (BEA) helps companies evaluate, start up and develop projects of an innovative nature or those with a technological component.

INNOVIRIS

The current scientific research strategy in Brussels is grounded in the Regional Plan for Innovation 2007-2013 (PRI). The environment is one of the three pillars on which the Brussels-Capital Region has decided to develop excellence in research. In terms of specific actions, the Region has decided to strengthen technological potential from academia and support for research and development by enterprises. INNOVIRIS supports research on environmentally friendly and sustainable development through its financing programmes described above.

Stimulus programme for the environment

This programme supports innovative research projects with medium-term value creation. Initiated in 2008, it is a three-year, renewable for an additional three years. The programme targets research institutions in Brussels of university level or equivalent that present a project involving structured cooperation.[57]

Projects selected in 2008 included GASEPOC, aiming to design and develop new electrochemical sensors and methods to monitor accurately the quality of biogas before and after combustion – and in particular to quantify precisely the methane and carbon dioxide they contain. The objective is to adapt combustion parameters with the aim of optimizing energy recovery while minimizing environmental impact.

Environment Strategic Platform

In 2012, in addition to extending projects funded under the stimulus programme, INNOVIRIS launched a new action for the creation of an Environment Strategic Platform. This action will finance projects carried out by Brussels-based research bodies (universities, collective centres, higher education institutes) with the goal of stimulating sustainable renovation of existing housing. The platform is made up of 13 laboratories in Brussels working on 11 projects addressing the real needs of the contracting authorities and enterprises in the construction sector through priority thematic areas such as eco-construction, renewable energy, life cycle analyses or study of socio-economic aspects. This platform differs from stimulus programmes due to the direct involvement of representatives of industry in the choice of subjects proposed to research teams. Four subjects addressing the needs of industry in Brussels were selected. They aim to boost employment through competence development in the construction-related Brussels industrial base, on the one hand, and to reduce the overall environmental footprint of the Brussels-Capital Region, on the other. The subjects are as follows:

- Energy and comfort Improvement: *Sustainable retrofit of urban blocks and buildings in BCR, MicroEnergy storage in building and Wind Energy and conditions in the built environment*

[57] In the context of the Environment Stimulus Programme, the following six projects were funded from May 2009 to April 2012:
1/ Holoflow (ULB and VUB), Advanced digital holographic microscopy and 4D imagery for applications in water technology and environmental monitoring. EUR 1 759 881
2/ GESZ (ULB et VUB), Towards the “good ecological status” in river Zenne: re-evaluating Brussels’ wastewater management. EUR 1 315 540
3/ OXEROM (ULB and UCL), The potential of white rot fungi oxidative enzymes systems for removal of organic micropollutants in urban and industrial wastewaters. EUR 901 271
4/ GREENCOAT (**ULB** and VUB, Development of “Green” Coatings with Multifunctional Properties. EUR 1 441 939
5/ TEFRACEM (ULB and CRIC), Valorisation of Municipal Solid Waste Incineration fly ashes and Air Pollution Control residues in cementitious materials. EUR 1 000 635
6/ GaSePoC (ULB and UCL), Chemical Gas Sensors for Biogas Pollution Control. EUR 1 070 321
Total: EUR 7 489 587

- Sustainable Materials, Components, Concepts: *Self-heating coatings in architecture*
- Application and industrialisation: *Dynamic re-use strategies for the retrofitting of post-war housing*
- Socio-economic Aspects: *Evaluation of retrofitting concepts from a life cycle perspective*.

Prospective Research for Brussels

Research projects eligible for funding under the Prospective Research for Brussels (PRFB) programme must be original and forward looking. They must constitute a contribution to study on the Region's development. As a result, research teams can be created at universities in Brussels that constitute centres of competence in various areas of regional interest, including the environment. IBGE/BIM treats many research projects subsidised under this programme as particularly important in background notes for the preparation of environmental strategies and they may evolve into research-action partnerships.

WB Green

In 2010, in the context of the Wallonia-Brussels joint action plan for research, the two regions developed major links with the participation of Brussels-based enterprises in the Walloon Centres of Competitiveness (Biowin, Skywin) defined in the Marshall Plan 2.green. To give continuity to these actions, the two regions decided to team up to finance the WB Green mobilising programme launched in 2011 for funding in 2012. This programme aims to support industrial research in the priority area of sustainable development and the environment. Eligible for funding under this programme are industrial research projects on certain predefined key subjects (mobility and transport, biodiversity, product life cycle, reduction of inputs and consumables in production processes, waste management, etc.), whose results will impact the environment, economy and employment in both regions.

Brussels Environment (IBGE/BIM)

The *Environment Research Laboratory* operated by Brussels Environment IBGE/BIM participates in methodological research on environmental audits in the area of ambient air quality.

IBGE/BIM also finances numerous academic or private research services related to comprehensive environmental inventories and audits on biodiversity and water, for example. It also seeks the expertise of applied research organisations on matters of indicators and technical recommendations. Research plays a decisive role in the on-going improvement of air quality management. This aspect of research is based on two pillars: the development of measurements enabling better comprehension of observed phenomena, particularly concerning evolution of the composition of fine particles; the use of increasingly sophisticated models to assess and predict the population's exposure to pollution.

In the context of developing its Air-Climate-Energy Plan, IBGE/BIM financed different studies related to the region's climate policy. IBGE/BIM also funded a study on adaptation to climate change, carried out in 2012 by the EcoRes–TEC Conseil–Factor X consortium. This study includes climate projections at the regional level and identifies climate change impacts for the region, the region's vulnerability to such impacts, adaptation measures already in place that should be strengthened and new adaptation measures to be adopted.

8.3. Systematic observation

Summary of Belgian contribution to the Global Climate Observing System (GCOS) – status September 2013

8.3.1. Ground based measurements in Belgium

8.3.1.1. Ground stations.

Belgium is well covered by synoptic meteorological stations, which are operated by the Royal Meteorological Institute of Belgium (RMIB, 13 stations), the civil aviation service Belgocontrol (7 stations), and the military aviation service Meteowing (9 stations). They are part of the World Meteorological Organisation (WMO) Global Observing System (GOS). In the RMIB network, the new station of Stabroek near Antwerpen became operational in August 2012. A modernisation of the stations of Meteowing and of the RMIB is ongoing.

Since 1880, the RMIB has also been operatinga dedicated network of currently more than 250 climatological stations with daily manual recording of min/max temperature and precipitation.

The longest and best analysed time series have existed in Ukkel, since 1886, preceded and partly overlapping with measurements from Sint-Joost-Ten-Node since 1833. Ukkel is the only Belgian station which is part of the GCOS Surface Network (GSN).

The three stations of Ernage (in the center of the country), Beitem (relatively close to the coast) and Mont-Rigi are part of the Eumetnet EUCOS network which covers Europe with 250 km spacing.

8.3.1.2. Upper air stations

Long term upper air balloon soundings as part of the WMO GOS are available from Ukkel operated by the RMIB, and since the summer of 2008, midnight soundings have been started up from Bevekom operated by Meteowing with material and consumables provided by Belgocontrol.

Ozone profiles are included in the Ukkel soundings since 1969. The total amount of ozone and UV spectra has been measured with ground based spectrophotometers since 1971. The Ukkel ozone measurements are part of the Network for Detection and Attribution of Climate Change (NDACC), of the WMO Global Atmospheric Watch program and are archived in the World Ozone and Ultraviolet Data Centre (WOUDC).

After the Iceland volcano eruption, a single wavelength ceilometer reaching up to 14 km was installed in the synoptic station of Ukkel in May 2010. Three more ceilometers are scheduled to be installed end of 2013 or in 2014 in the synoptic stations of Zeebrugge, Diepenbeek and Humain.

8.3.1.3. Precipitation radars

Belgium has three operational meteorological precipitation radars. The oldest one has been operated by Belgocontrol in Zaventem since 1973 and was modernised in 2003. The second one has been operated by RMIB in Wideumont near Libramont since 2001. The newest one - which is of the dual polarisation type - was inaugurated by RMIB in Jabbeke in 2012. The Vlaamse Milieu Maatschappij (VMM) plans to install a fourth radar in Houthalen-Helchteren.

8.3.1.4. North Sea observations

Two fixed offshore meteorological station are operated by the Flemish Region (MDK – Afdeling Kust), 'Meetpaal 0' and 'Meetpaal 7 – Westhinder'. Belgium has two research vessels, the 'Belgica' operated by the Federal Government (Belspo and Royal Belgian Institute of Natural Sciences in cooperation with the Belgian Navy) and the 'Simon Stevin' operated by the Flemish region (Flanders Marine Institute in cooperation with DAB Vloot). Both semi-continuously perform meteorological and carbon-related measurements.

8.3.1.5. River discharge

Belgium is crossed by two major rivers flowing to the sea, the Maas and the Schelde, and by a smaller river called the Ijzer. The discharge of the Maas to the sea is included in the Global Terrestrial Network – River Discharge (GTN-R) through a station at the mouth of the Maas in the Netherlands. Stage gauges covering the Schelde and the Ijzer are operated by the Department of Public Works (MOW), see http://www.waterstanden.be. The discharge of the Schelde and the Ijzer to the sea could be covered in the GTN-R network by including a stage gauge near Antwerpen and Nieuwpoort.

8.3.1.6. Aerosol

Belgium has two Aeronet stations, one in Oostende operated by the Royal Belgian Institute of Natural Sciences, and a second one in Ukkel operated by the Belgian Institute for Space Aeronomy (BIRA-IASB) since 2006. RMIB plans to install a third one in Dourbes.

From its Brewer spectrophotometer, the RMIB derives the UV aerosol optical depth at 320 and 340 nm.

From the MAXDOAS infrared instrument operated at Ukkel, BIRA-IASB retrieves aerosol information.

8.3.1.7. Lightning detection

The RMIB operates a lightning detection network for the observation of both cloud to ground and intra-cloud lightnings since 1992. Originally it was a Safir network based primarily on VHF interferometry with auxiliary LF sensors. Currently it is called the Belgian Lightning Location System (BELLS) and it is gradually modernised.

8.3.1.8. Carbon monitoring

Belgium takes part in the European research infrastructure project Integrated Carbon Observing System (ICOS). The Belgian focal point is the PLECO research group together with the ECO excellence centre of the University of Antwerp.

Flanders has 2 operational Ecosystem Stations in Brasschaat and Lochristi, and a third one is under construction in Maasmechelen.

In Wallonia the research group 'Unit of Biosystem Physics' has 3 Ecosystem stations in Vielsalm, Lonzée and La Robinette.

The previously mentioned research vessels Belgica and Simon Stevin participate in the measurement of carbon at sea.

8.3.2. Foreign ground based measurements

8.3.2.1. Atmospheric composition - NDACC

The Belgian Institute for Space Aeronomy (BIRA-IASB) is actively involved in the Network for the Detection of Atmospheric Composition Change (NDACC, formerly the NDSC), a major contributor to GCOS. In addition to operating its own NDACC-certified instruments at three stations in Europe and two stations on Reunion Island, it also co-chairs three Working Groups of the network: the Infrared WG, the UV-Visible WG, and the satellite WG. Several NDACC measurement activities of BIRA-IASB are carried out in collaboration with the University of Liège (ULg) and the Free University of Brussels (ULB).

Measurements have been taken at Junfraujoch (Switzerland) since 1990, Harestua (Norway) since 1994, and Observatoire de Haute Provence (OHP, France) since 1998. They have also been performed at Ile de La Reunion since 2002 on a campaign basis, with transition to routine measurements from 2009 onwards. New instruments have been placed in Saint-Denis near the coast in 2011 and Maïdo around 2000 m altitude in 2013.

The measurements are done by FTIR spectroscopy and provide the amount of CO_2, troposperic and total column amounts of other GHGs like H_2O, N_2O, O_3 and some HCFC's.

New Maxdoas and Cimel instruments will be installed in Bujumbura (Burundi) in 2013.

8.3.2.2. African measurements

In the former Belgian Central African colony Congo and the mandate area Ruanda-Urundi, meteorological and climatological measurements were made following the same standards as in Belgium. The paper archives of these measurements are stored in het Rijksarchief. The Congolese measurements go up to 1959.

During the DARE (Data Rescue) project meteorological data from Africa as a whole have been archived on microfilms. The microfilms are stored at the RMIB. Most of the data goes up to 1990.

The Royal Museum of Central Africa (MRAC) has digitised monthly data (from « Bulletin climatologique annuel du Congo Belge et du Ruanda-Urundi ») for the period 1950-1959:

- Air T° max (83 stations)
- Air T° min (83 stations)
- Evaporation (83 stations)
- Humidity (60 stations)
- Sunshine (54 stations)
- Precipitations (16 stations)

A monitoring of Lake Tanganyika was implemented by MRAC and its partners (Department of Fisheries in Zambia and the Tanzania Fisheries Research Institute).

Regular lake observations (every two weeks) were done at two lake stations: one in Zambia and one in Tanzania in the framework of two research projects in the 2002-2006 period financed by BELSPO.

Amongst the essential variables mentioned as essential by GCOS, those were measured:

Lake temperature and conductivity. Water level was also recorded in Zambia.

Planktonic groups were studied through field observations by Ghent University and Namur Faculties and from remote sensing at Liège University.

Regular physo-chemistry survey have been undertaken in 40 crater lakes of Uganda since 2007 in the framework of the CLANIMAE project of BELSPO (Climate and anthropic impact on African ecosystems). Thermistors have been placed and retrieved from 4 lakes. Paleo-climate study of the sediments is taking place to re-construct climate history of the past thousands years in East Africa.

Among the ECvs of GOCS, the land cover (including vegetation type) of those volcanic basins was studied in the framework of CLANIMAE to quantify the anthropic impact on lake ecosystems.

An inventory based carbon stock estimate has been obtained for the region of Yangambi in Congo by the Laboratory of Plant Ecology of the University of Ghent in collaboration with national and international partners, with publication in 2013.

8.3.2.3. Antarctica

Belgium has opened a new research station 'Princess Elisabeth' in Antarctica, being also the first zero emission Antarctic research station. During the first Antarctic summer season of 2008-2009, 2 climate observing projects were initiated, installing some year-round monitoring instruments.

KUL installed an automatic weather station measuring the surface weather and the energy balance and a ceilometer.

RMIB/BIRA/University of Gent installed instruments for the measurement of aerosol optical depth and black carbon concentration. In addition an aerosol particle counter and a Brewer spectrophotometer for ozone column, UV radiation and UV aerosol optical depth have been installed.

8.3.2.4. Kiev

The RMIB is sending a spare spectrophotometer to the University of Kiev for routine measurements of UV spectra and ozone.

8.3.3. Satellite observations

In dedicated areas of satellite observations, Belgium makes contributions at international or European level.

8.3.3.1. Earth radiation budget

For the Earth radiation budget, the RMIB is the main data processing centre for the Geostationary Earth Radiation Budget (GERB) instrument on board of Meteosat 8, 9 and 10 with operational data since 2004. The Meteosat field of view includes Africa, Europe and the surrounding oceans.

The RMIB is also a CoInvestigator in the NASA CERES program which provides earth radiation budget data with global coverage.

8.3.3.2. Solar irradiance

The RMIB is one of the leading institutes for the measurement of Total Solar Irradiance (TSI), with in total 6 different space instruments on eleven space flights starting with the first instrument on Spacelab in 1983. Currently the RMIB has an active instrument measuring from the SOHO satellite since 1996 – as part of VIRGO which is the longest measuring TSI instrument package in space, and with an instrument on the French Picard microsatellite measuring since 21 July 2010. The RMIB has contributed to the international effort for the revision of the Solar Constant, which is a point of debate ever since the launch of the TIM/SORCE instrument which suggests a new value of the Solar Constant around 1361 W/m^2. The RMIB has reinvestigated its value, and has found a new independent value around 1363 W/m^2 at solar minimum.

BIRA is one of the leading institutes for the measurement of spectral solar irradiance with currently operational measurements from the International Space Station.

8.3.3.3. Atmospheric composition

BIRA-IASB contributes to the operational retrieval algorithms for several satellite measurements of ECVs, by providing prototype retrieval algorithms and by working on their transfer to the operational environment. ECVs: methane and aerosols for IASI on board of the EUMETSAT MetOp series, and ozone for the ERS-2 GOME, Envisat SCIAMACHY and GOME-2 satellites.

BIRA-IASB contributes actively to other international satellite missions measuring ECVs through geophysical validation and retrieval studies.

BIRA-IASB retrieves stratospheric aerosols from the SAGE and GOMOS satellite missions, and develops unified, long-term databases of stratospheric aerosols measured by different satellite instruments.

BIRA-IASB develops and operates the BASCOE 4D-var chemical data assimilation system. BASCOE has particular capabilities of generating consolidated long-term and global data sets of ozone and other GHGs through the re-analysis of satellite data records.

8.3.3.4. Vegetation

VITO (Vlaams Instituut voor Technologisch Onderzoek) hosts the data processing centre for the SPOT Vegetation satellite (CTIV). VITO also processes and archives data from the following satellites: ENVISAT-MERIS, NOAA-AVHRR, MODIS, MSG, METOP-AVHRR. Resolution, spatial coverage, historical archive depend upon the satellite characteristics but have started since 1981 for NOAA-AVHRR and since 1998 for SPOT-VEGETATION. Amongst others, the following vegetation parameters are routinely produced:

- fAPAR: fraction of absorbed photosynthetically active radiation
- DMP: Dry Matter Productivity
- Leaf area Index (LAI)
- Burned Areas

Some of these parameters are multi-sensor (based on A(A)TSR & VEGETATION) e.g. LAI, burned areas.

The new Proba-Vegetation satellite providing a follow-up for the ageing Spot-Vegetation was developed in Belgium and was successfully launched in May 2013.

In this context VITO is service provider to EC-JRC and leads the Global Vegetation Component in the GMES GEOLAND initiative.

VITO has a number of activities and datasets for Africa & China related to land cover mapping focused on Agriculture.

8.3.3.5. Aerosols

In the context of the Eumetsat Climate Monitoring SAF and the Gerb project, the RMIB is deriving aerosol optical depth from the SEVIRI imager over the Meteosat disc.

BIRA-IASB participates in the ESA CCI project for the determination of the Aerosol ECV.

8.3.3.6. Evapotranspiration

In the context of the Eumetsat Land Surface Analysis SAF, the RMIB is deriving Evapotranspiration from the SEVIRI imager over the Meteosat disc.

8.3.3.7. Ozone

In the context of the Eumetsat Ozone Monitoring SAF, the RMIB is responsible for the validation of satellite retrieved ozone profiles by comparison with balloon soundings.

BIRA-IASB is the prime contractor of the ESA CCI project for the determination of the Ozone ECV. The RMIB also participates in this project.

8.3.3.8. Landcover

The Université Catholique de Louvain (UCL in LLN) is the prime contractor of the ESA CCI project for the determination of the Landcover ECV.

9. Public awareness, education and training

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9.1. Introduction

Effective reduction of greenhouse gas emissions requires that all levels of society be well informed. This chapter reports on the actions taken in Belgium to raise public awareness of climate change, education and training relating to this issue. It presents essentially the activities organised or financed by the public sector, but also mentions actions undertaken by certain organisations of civil society or the private sector made possible by public funds.

The objective is to present not an exhaustive list but rather various initiatives which contribute to raising awareness in Belgian public opinion.

Most of the actions organised do not relate solely to knowledge of the causes and consequences of climate change and their prevention, but tackle them in the more general context of sustainable development.

Finally, a list is provided of relevant internet sites.

9.1.1. General raising of awareness

The media have given great resonance to climate change and contributed in turn to increasing interest in this subject. The recent financial crisis has also increased awareness of the need to cut spending on energy, which represents a very significant part of household and company budgets, particularly for transport and, in our cold climate, for heating.

Major promotional campaigns, both public and private, on behalf of installing solar thermal panels, supported by grants, and for installation of photovoltaic panels, with both grants and green certificates, and energy efficiency legislation, with the EPB and EPB Certificate, have contributed as well to raising public awareness of energy management.

9.1.2. Is the Belgian public aware of the problem of global warming?

Eurobarometer survey of May 2013

In summer 2013, the EU published the results of the ‘Standard Eurobarometer’ survey No 79, which was carried out between 10 and 26 May 2013, with interviews of 26 605 citizens in the 27 EU Member States, the 6 candidate Member States (Croatia, the Former Yugoslav Republic of Macedonia, Turkey, Iceland, Montenegro and Serbia) and the Turkish Cypriot Community. 1 013 Belgians also took part.

This is a general survey, with questions on EU citizenship, the political institutions, concerns, the economic crisis and the future (the EU in 2020), and therefore there were relatively few questions on climate issues. Nevertheless, there are some findings which are certainly worth mentioning.

1/ The theme 'environment, climate and energy'

At **national** level, this theme is considered not to be very important: only 4% of the European respondents and 3% of Belgian respondents consider these themes to belong to the two most important themes, which is the second lowest score. The economic situation and all other financial aspects (unemployment, inflation, pensions, taxes, government debt), crime, health, immigration, etc. are found to be more important. These results confirm the general trend which has already been in progress for some years.

When asked which themes citizens **personally** consider important, 5% of respondents and 10% (!) of Belgians considered the theme 'environment, climate and energy' to be one of the two most important themes.

2/ The Europe 2020 targets

The targets in the European Energy/Climate package, on the other hand, are considered to be quite credible: 'to increase energy efficiency by 20% by 2020' is even considered to be one of the two most credible targets by 59% of EU citizens and by 58% of Belgians, followed by 'to increase the share of renewable energy by 20%' (57% and 53% respectively) and 'to reduce greenhouse gas emissions by at least 20% compared to 1990' (54% and 46% respectively).

It is therefore striking that the Belgian respondents adopt a more critical attitude than the average European and the level of ambition of these 3 targets – which are extremely important for the climate issue – are deemed to be credible significantly less frequently. The other Belgians consider these targets to be too ambitious or too modest (both account for about the same share).

Federal public survey on climate change

In autumn 2013, the Federal Climate Change Service launched a third public survey to gain a better understanding of the (evolution between 2005 and 2013 of the) knowledge of the general public about the climate change problem (causes and consequences, information channels, etc.), the subjective interpretation (urgency, government efforts, possibility of personal contribution, etc.) and the personal attitude (the willingness of each person to do something about it). The results of this survey are available via the climate website www.klimaat.be.

9.2. Raising awareness of global warning

In order to raise public awareness, activities linked to a day/month of energy savings, the environment, biodiversity or mobility are organised every year across the country. These large-scale initiatives are supplemented by more specific efforts at awareness-raising or by easily applicable practical solutions intended for certain target groups such as the young, energy managers in companies or other professional groups (architects, teachers, heating technicians, mobility managers, etc.).

Campaigns relating to climate change are presented below, those about energy or mobility are presented further on.

9.2.1. Earth Hour

For some years, the WWF has been calling on all public authorities, cities, businesses and citizens to turn out the lights at the same time for 1 hour in the early evening on a weekend day in March to show their support for combating climate change.

This awareness-raising action, known as 'Earth Hour', is part of an international campaign by the WWF against climate change. The participants, through this symbolic action, call on governments to take more action, but also roll up their own sleeves.

The action is experiencing ever growing success: in 2013 too, several dozen Belgian towns and municipalities turned off their public lighting and called on their inhabitants to do the same. In Brussels, hundreds of people celebrated Earth Hour dancing at the Atomium with choreography specially written for this occasion and some 6000 signed up to one or more actions which together brought about savings of some 52 tonnes of CO_2.

9.2.2. Exhibition “Satellites and World Heritage sites”, partners to understand climate change

This exhibition had been initially developed by UNESCO with the financial aid of the Flemish Government and thanks to generous contributions from a number of space partners: Belgian Science Policy, Planet Action (France), the European Space Agency (ESA) and the German Aerospace Centre (DLR). A series of 25 panels shows satellites images of selected World Heritage sites. Through a series of remarkable examples, the exhibition highlights the specific climate change challenges facing selected World Heritage sites and demonstrate the use of satellite observation to assess the effects of Climate change on these sites.

Reduced rainfall, higher sea and land surface temperatures, more severe storm events, ocean acidification and rising sea levels are all expected to have a significant impact on World Heritage sites. The conservation of natural and cultural heritage may be jeopardized by climate change. Glaciers are melting, coral reefs are exposed to bleaching, and terrestrial biodiversity is being affected. Rising sea levels threaten many cultural sites located near the coast, and other aspects of climate change are affecting ancient archaeological sites.

The exhibition shows a wide variety of climate change effects on World Heritage sites and explains the inputs provided by space technologies to understand the causes and effects of climate change on these sites. One important aspect of the exhibition is the overall introductory panels showing the effects of climate change at continental level. For these panels, images of the SPOT VEGETATION sensors have been used. Belgium, via the Belgian Science Policy, has been one of the most active partners in the VEGETATION programme. The VEGETATION satellite images were processed by University of Louvain.

The initial exhibition was shown in Cancún (16th UNFCCC Conference - December 2010), Beijing, Paris, Durban (17th UNFCCC Conference - December 2011). Early 2012, the Belgian Science Policy adapted the exhibition for the Belgian public. New panels were printed with texts in French, Dutch and English, so that the population of Brussels, its teachers and students, could discover how satellites are helping to understand the effects of climate change on World Heritage Sites.

This initiative lies in the continuity of a very fruitful partnership between BELSPO and UNESCO to use space technologies to improve the monitoring and managementof famous World Heritage sites. The Belgian version of the exhibition has already been shown in Brussels (Parc du Cinquantenaire), in Flanders (Katholieke Universiteit Leuven) and in Wallonia (Musée d’histoire naturelle de Mons and Centre de culture scientifique de Parentville).

A website is online since March 2012: http://eoedu.belspo.be/unesco.

An accompanying brochure in Dutch and French has also been developed in collaboration with the Unesco Platform. 2000 copies were printed and distributed to a different types of public.

9.2.3. SOS PLANET

One of the most important organisations for the French-speaking general public and the schools was a superb exhibition entitled SOS Planet, set up in the brand new railway station of Liège designed by the architect Calatrava.

In 2010, the city of Liège held the title ‘Liège: universal climate city’ and the exhibition was a highlight.

An immense map of the world bearing the inscription ‘SOS planet’ dominates the new Liège railway station.

The exhibition ‘SOS PLANET’ took place in the context of the Belgian Presidency of the European Union, under the honorary chairmanship of Herman Van Rompuy. It opened its doors to the general public on 4 September 2010 and closed them in July 2011, with a total of some 100 000 visitors.

The exhibition 'SOS Planet' focused on the four natural stages of the human spirit in its desire to conquer the world and to master knowledge. Spectacular scenery symbolised possible disasters in the long term and showed the interaction between climate change and other problems to which it gives rise. This three-dimensional scenery was conducive to true awareness of the visitor through immersion.

Visitors passed through a tunnel of melting ice, walked carefully on the shifting pack ice in the process of breaking up, then on the cracked surface of a dried-up river, before entering the humid atmosphere of an almost flooded house. A route was specially adapted for children with questions designed for their level and an educational file made available.

Photo Angelo Imbiscuso

Based on the reports of the IPCC (Intergovernmental Panel on Climate Change) and under the scientific direction of Jean-Pascal van Ypersele, 'SOS PLANET' was the largest exhibition ever organised in the world on global warming.

SOS Planet was also the first exhibition in Europe to present 3D animation films and also presented, as a world first, the use of 3D television sets without goggles. The exhibition was largely financed by the public authorities (Public Service of Wallonia, Walloon ministerial cabinets) and private sponsors.

9.2.4. Federal communication to the general public

The federal authorities' communication to the public is undertaken by the Climate Change Section of the Federal Public Service Health, Food Chain Safety and Environment (DG Environment) via brochures and specific guides, the internet and thematic media campaigns (magazines, websites and radio). These various instruments of communication are used by the authorities to disseminate information on climate change and the specific situation of Belgium. They deliver to the public all official reports, decisions of the Federal Government and concrete actions which concern the citizens.

The internet site http://www.climat.be / www.klimaat.be remains the basis for the dissemination of information and offers headings on the phenomenon of climate change (causes and effects), the policy, financial support, etc. but also a separate section devoted to actions (federal campaigns, private actions to be taken, etc.). In addition, there is also a news heading which calls attention at regular intervals to new developments (results of international meetings, reports published, actions taken). At the end of 2013 this website was fully modernised, with special attention to the transition to a low-carbon Belgian society by 2050 (see 9.4.8).

9.2.5. Support for local awareness-raising initiatives in favour of the climate

At local level too, there are driving forces to approach the climate problem. Although the scale of local measures tends to be limited, these actions can have a significant impact if a large number of municipalities and the provinces participate. These actions can also create a wider basis for measures and contribute to greater awareness of both mitigation and adaptation. Local measures can also cause a snowball effect, as a result of which the total potential can be significant.

In 2006, the **Federal Climate Change** Service devised a subsidy to encourage events which increase involvement of citizens and prompt them to take concrete action. Each individual or legal entity organising such an event offering information and training could apply. The grants couldn't be made to political parties or used in support of political programmes. The contents had to be directly linked to the theme of climate change and the information provided had tot be scientifically correct; the presenters had to possess the necessary competence and the information session had to be solution-oriented (proposing techniques, measures and actions which may make a contribution to mitigating climate change). This support ran until the end of 2011 and was ended in 2012.

Since reduction of greenhouse gas emissions is also a priority objective for local authorities, the **Flemish authorities** will support results-oriented climate projects at local level from the Department of Environment, Nature and Energy (DLNE). The focus here will be on reduction of greenhouse gas emissions from buildings, energy generation and transport within municipal territory. In addition to the objective of climate mitigation, DLNE has put forward a further 5 other objectives: local quality of life, biodiversity, environmentally responsible consumption & sustainable use of materials, flooding and drought, and soil erosion. Adaptation plays a role in these 5 other objectives, but also with mitigation, this worthwhile project should enable synergies to be generated.

Under Flemish urban policy, city programmes are introduced as the successor to the city contracts 2007-2012 with the 13 Flemish regional capitals. In consultation with the Flemish authorities, the cities can opt for a ‘climate-neutral city’ urban programme.

To draw the attention of local authorities to the climate issue, the European Community developed the Covenant of Mayors. In mid-2013, nearly 50 cities and municipalities in Flanders signed this Covenant. The way in which local authorities set to work on the preparation, implementation and monitoring of these plans may differ considerably, however. Moreover, the potential of this instrument has not yet been exploited to the full. The focus of the content lies heavily on energy-saving in the buildings sector and transport measures are generally confined to the municipal car pool. Studies show, however, that supplementary measures are necessary in the transport sector and can also be cost-effective. The Flemish authorities will therefore offer support to cities or municipalities joining the Covenant of Mayors.

The Brussels Capital Region signed up to the Covenant of Mayors in December 2008. One of its municipalities, Molenbeek-Saint-Jean, acceded to it in December 2009.

To encourage the Walloon municipalities to sign up to the Covenant of Mayors, Wallonia has launched an initiative – the Pollec initiative - enabling 20 municipalities to receive assistance to carry out an initial diagnostic analysis and to draw up an action plan. More information is available at http://www.apere.org/index/mode/133.

9.2.6. Regional plans for the climate and their promotion

Along with a National Climate Plan for Belgium, climate plans have also been drawn up and promoted by the Regions.

A brochure was disseminated to promote the **Flemish Climate Policy Plan** 2006-2012, containing tips for consumers to achieve the objectives of the plan together. Nowadays, however, the general public can be reached more effectively via the internet, so on the final approval of the Flemish Climate Policy Plan 2013-2020, the campaign site www.klimaattips.be was launched. This site focuses on suggestions for a wide range of themes on what each Flemish citizen can do to contribute towards a healthier climate. References are made here for each (sub)theme to relevant sites and brochures (which can be consulted on the internet) with more detailed information. In addition, the actions of the Flemish authorities themselves are also described and a section is being developed with explanations on climate change and what this means for the Flemish.

A brochure to raise awareness and an internet site airclimat.wallonie.be present the **Air/Climate Plan of the Walloon Region** (Plan *Air-Climat*), in which all kinds of tips are provided and reference is made via links to various sources of practical information, including CO_2 calculators. A quiz is also offered.

The Walloon Air and Climate Agency has designed a series of 12 posters entitled ‘Climate Change: better understanding for better action’. Several copies of this exhibition were offered for hire free of charge to schools, cultural centres, authorities, etc. A speaker was also available to present introductory speeches on the problem in schools or during these exhibitions.

Several practical tools to raise awareness of the climate and energy challenges, adapted to various sectors of the public (schoolchildren, adults) are distributed by the Environmental Awareness Unit (CREA) of the Public Service of Wallonia and are used in school environments and during events.

In addition to these climate plans, the regions also take part in a number of initiatives which bring the situation of the living environment in general and the data concerning climate change in particular into focus. Flanders is publishing these data in the MIRA/VMM annual indicator reports and in the online catalogue of indicators which are updated annually on www.milieurapport.be. For Wallonia, reference can likewise be made to the scoreboards (the State of the Environment), which are also available online at http://etat.environnement.wallonie.be/

9.2.7. Magazines, brochures and broadcasts in Brussels

A series of publications aimed at different sectors of the public has been produced by the environmental administration of the Brussels Capital Region, known as ‘Bruxelles-Environnement’ (*Brussels Environment*). Brussels Environment is continuing the publication and dissemination of magazines, brochures and leaflets relating to the environment, mentioned in the previous National Communication on Climate Change, such as, for example, the monthly magazine *Ma Ville Notre Planète*, the quarterly magazine *Bruxelles Environnement News* and the monthly electronic newsletter *E-news destinés aux professionnels*.

The Brussels Environment internet site contains all the information on the situation and environmental and energy news (advice, regulations, forms, tools, accredited suppliers, lists of installation companies, etc.) and on the regional policy in this matter.

The Environment Festival is an annual event, organised by Brussels Environment and attended by all environmental associations. Its aim is to raise awareness in the general public to environmental issues in a festive atmosphere.

Brussels Environment also organises communication campaigns (television ads, posters, announcements in the press) on rational use of energy, promotion of energy-saving investments, as well as on mobility, encouraging the public to select less polluting means of transport. Each year, Brussels Environment organises one or two major 'flagship' campaigns on one of the priorities of the environmental conservation policy in Brussels, using mass media (TV, radio, posters, events, etc.) and more significant financial resources. In both 2011 and 2012, the new Belgian regulations on the energy performance of buildings were the subject of such a campaign.

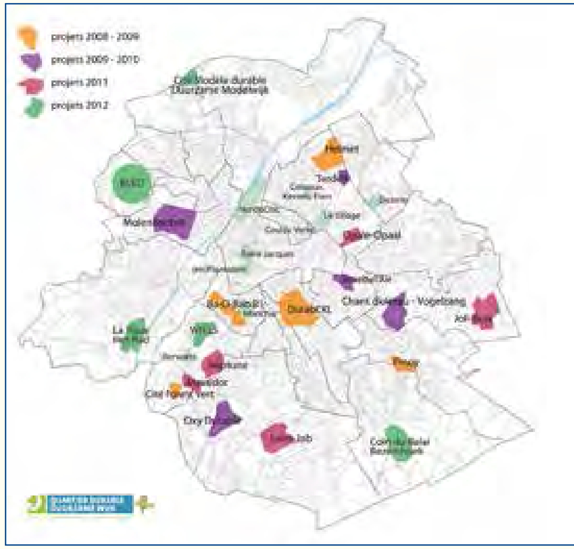
In 2011, Brussels Environment undertook various awareness-raising actions on the theme of '**Brussels, A Sustainable City**', including in particular an exhibition, an offer of combined visits of exemplary buildings and sustainable neighbourhoods in Brussels for international visitors, a brochure '**Brussels, from eco-building to sustainable city**', available in three languages (FR-NL-EN), which has been widely distributed throughout the year. The awareness of private individuals in Brussels of sustainable building has also been increased through active presence at various events (Energy Exhibition, Passive House Platform Exhibition, Festival of the Environment and Batibouw) and the organisation of conferences and visits to 'inspiring' building sites.

With a view to encouraging Brussels citizens on modest incomes to make useful investments in energy rationalisation, Brussels Environment relaunched a campaign on the '*prêt vert bruxellois*' (Brussels Green Loan) (previously known as '*prêt vert social*') in 2011 and 2012. This campaign, which had as its main message: 'loans at 0% (APRC) so that everyone can insulate' mainly concerned private individuals in Brussels owning ordinary houses, on low incomes, who do not have access to traditional bank loans when they wish to make housing investments with a view to reducing their energy bills.

Brussels Environment also participated in the Editing Committee and closely monitored the preparation and publication in three languages (FR, NL and EN) of a key book taking stock of five years of calls for 'BatEx' projects (exemplary buildings, see below) and entitled 'A Bruxelles, les bâtiments exemplaires se racontent' (Exemplary buildings success stories from Brussels, published by Racine and Lannoo).

9.2.8. The Climate Quaters

Climate Quarters are groups of families, living in the same street or quarter, or knowing each other via an association, a club, a school, work, etc. They launch a bet with their own municipality: in six months (from November to April), they will try to save 8% energy in comparison with the same period of the previous year. In order to do so, however, participants do



not have to invest in new technologies: the project aims at changing behavioural patterns in the first place. With this in mind, participants meet from time to time, receive practical energy-saving tips and read their electricity and natural gas meters on a very regular basis. These meter data are recorded on the project's website, which will calculate the progress being made, taking into account the differences in outside temperatures with those of the previous year.

The project is organised by *Bond Beter Leefmilieu* ('Association for a Better Environment – the umbrella organisation of the Flemish environmental organisations) in collaboration with the NGOs Dialoog and Ecolife, the Flemish provinces, the grid managers and the participating municipalities, and with the support of the Flemish Region and (in 2008-2009) of the European Intelligent Energy Programme.

In 2010, the seventh – and at the same time the last – edition of this successful project took place, which was followed by 'The Energy Hunt' (see 9.4.7).

9.3. Raising awareness of the environment

9.3.1. Belgian Awards for Energy and the Environment

Since 2006, each year the Belgian Energy and Environment Awards (www.eeaward.be) recognise those who, either as individuals or via their organisations, contribute in an exceptional way to building a sustainable future at the local, regional and national levels. Experts from the country's universities assist the panel, taking into account in particular the spirit of enterprise/dynamism, the innovative nature of the achievement, its economic viability, long-lasting improvement of environmental performance, the move away from fossil fuels, and the improvement of general well-being.

Fifteen prizes are given out within the framework of the EEAwards: a citizen's project, a project by young people, a project in the business category, the institutional category, a prize for the media, etc.

The Award is supported by industrial and institutional partners, as well as by the International Polar Foundation and more than 100 organisations which pass the invitation to their members. There is also significant support coming from the media and outside the media (federations, associations, administrations) throughout the year.

In 2012, Brussels Environment itself submitted projects in this context. Its projects PLAGE (local action plans for energy management, see 9.4.10) and BATEX (exemplary buildings in terms of eco-construction and energy) both received awards in the category 'Institution Sustainable Development Award'.

9.3.2. Stop pub

In order to help citizens put a stop to printed matter and junk mail advertising which is distributed to all mailboxes, and so to make a friendly gesture to the environment, a number of authorities and NGOs have distributed self-adhesive labels which can be stuck to the mailbox.

In addition, there is also the Robinson list which offers the possibility to have your name and address included in a database of people who no longer wish to receive unsolicited advertising via the post from firms member of the BDMA (Belgian Direct Marketing Association).

9.3.3. Nature and environmental education for adults (associations)

As part of its nature and environmental education, the Flemish government has set up the operation 'Not for novices'. This operation primarily targets socio-cultural work for adults. The operation encourages and supports adult organisations in devising and carrying out nature and environmental activities by providing information and methodologies, looking for partners, etc.

9.3.4. Eco-efficiency scan

The eco-efficiency scan, which was proposed in the Flemish Region, provides businesses with thorough screening regarding the various aspects of eco-efficiency: introducing more environmentally-friendly processes, designing (converting to) more environmentally-friendly products, using waste, re-examining the markets, adapting demand and making economic and ecological benefits discernable.

9.3.5. Corporate social responsibility

Corporate social responsibility (CSR) is an improvement process in which businesses, on a voluntary basis, systematically and consistently include social, environmental and economic considerations in their business management, in consultation with their stakeholders (customers, staff, suppliers). The Flemish government has set up the Corporate Social Responsibility Knowledge Centre (http://www.mvovlaanderen.be/) to inform and inspire businesses.

Brussels Environment is organising a large number of information and training sessions on environmental themes (energy, eco-construction, mobility, etc.). The seminars, colloquiums and guided visits are intended to inform professionals about the current legislation and the latest technological developments, to pass on technical advice from specialists and feedback from other bodies and to allow them to become familiar with exemplary installations. The training is organised in cycles which take place over several months and usually end with an evaluation leading to a certificate. The training is intended for a specialised public wishing to acquire specific knowledge in the technical field.

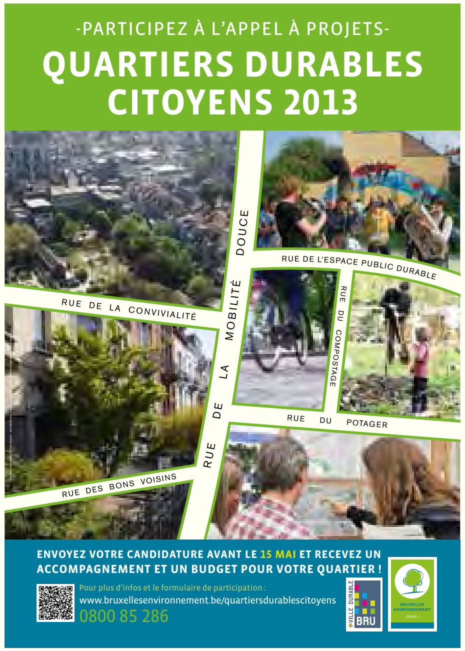
9.3.6. Environmental accounting in agriculture

In the Flemish Region, the farmers' staff services emphasise the usefulness of advice on and monitoring of environmental accounting (energy, water, fertilisers, pesticides). Information sessions and demonstration projects on energy crops and biofuels are organised for this target group.

9.3.7. Sustainable Neighbourhoods

In 2007, Brussels Environment set up an operational strategy with a view to promoting the emergence of particularly exemplary neighbourhoods with regard to sustainability in the Brussels Capital Region, as exist in other European countries: in Germany (Freiburg and Brisgau, 'Vauban'), in the United Kingdom (London, 'Bedzed') and in Sweden (Stockholm, 'Hammarby Sjöstad' and Malmö, 'BO 01'). This strategy concerns both existing neighbourhoods and those to be built up.

Since 2008, Brussels Environment has each year launched a **call for projects** with a view to the transformation of existing neighbourhoods into 'sustainable neighbourhoods'. Its objective is to support and develop citizen dynamism, through a public mechanism, with the aim of improving the environmental quality of a neighbourhood. These projects are based on bonds of neighbourliness and conviviality; they aim to transform individual behaviour and to create participative actions (workshops, exchange networks, reporting, exhibitions, etc.) and goods of collective interest (sustainable equipment or arrangements, such as a shared garden, bicycle rack, etc.), financed by Brussels Environment.



Brussels Environment makes a neighbourhood facilitator available to the selected neighbourhoods to assist them to implement their project. Inter-neighbourhood meetings are organised to exchange experience. A Sustainable Neighbourhood Journal is also published to report on the state of progress of the projects. A participative internet platform has been set up to facilitate contacts between these sustainable neighbourhoods and to perpetuate the experience, despite the end of the project guidance by the neighbourhood facilitator (www.reseauquartiers-durables.be). The Region has fifteen sustainable neighbourhoods.

Through actions to encourage, provide ongoing information, assist and guide, the 'Sustainable Neighbourhoods' **facilitator**'s role is to introduce into the planning tools, property operations and renovation programmes, at neighbourhood level, jointly and across the board, principles of sustainable town and country planning, eco-construction and energy economy, eco-management, eco-citizenship and sustainable mobility. This guidance service is aimed at any professional intervening in a neighbourhood for which environmental support may be helpful, whatever the state of progress of the project.

9.4. Raising awareness of energy savings

9.4.1. Energy info points

Introduced in the early 2000s, the main aim of the Energy info points of **Wallonia** is to provide all citizens interested with neutral, objective information and personal advice, free of charge, on energy efficiency and renewable energy sources. Their number increased in 2010 from 12 to 16 and in this way they are optimally distributed throughout Wallonia.

In **Flanders**, energy advice is given mainly by the various home shops operating in a large number of municipalities. In addition, a provincial office for sustainable construction and housing operates in each province, with an extensive visitors' centre.

9.4.2. Night of darkness

The Night of Darkness is still organised in Flanders and on 12 October 2013 already for the 18th time (http://www.bond-beterleefmilieu.be/nacht/index.php/247). The main aim is to raise the population's awareness of air pollution and in this way also of energy-saving. This activity is organised by the Bond Beter Leefmilieu, Preventie Lichthinder and the Werkgroep Lichthinder (VVS). This action has also been organised in Wallonia since 2008 and in the Brussels Capital Region since 2009.

9.4.3. October, Month of Energy-Saving

The Flemish Region proclaims the month of October as 'Month of Energy-Saving'. The focus is therefore placed on the theme of energy-saving during that month through a variety of initiatives and press articles.

9.4.4. Avoid energy-guzzlers at home

The Climate Change and Product Policy Sections of the Federal Public Service Health, Food Safety and Environment continued in 2010-2013 to invest in the website www.energivores.be / www.energievreters.be, which was launched at the end of 2006.

This website carries a calculator module for estimating energy consumption (and associated CO_2 emissions), for detecting energy guzzlers in one's home and above all for not letting new ones enter there by purchasing exclusively energy-efficient equipment or products.

An estimate can be made of the energy consumption of household electrical appliances (washing machine, drier, dishwasher, refrigerator, deep-freeze, TV) and other products having a major impact (cars, lighting) or of heat losses through windows, roof insulation and wall insulation. The site is very solution-oriented and offers the possibility of making a personal choice from more efficient models or good insulation materials which are available on the Belgian market. This avoids purchasing new energy-guzzling appliances or materials.

The website, regularly supplemented with new product modules and with databases updated monthly, has been promoted at regular intervals via a campaign addressed to the general public. An over-consuming, big fat refrigerator, car, washing machine, radiator and lamp are the key characters in the campaign launched at the end of 2006 and repeated at regular intervals to draw attention to the calculation module via a series of attractive, humorous visuals, banners on websites and in radio ads. More information on the website and the campaign is to be found at http://www.climat.be/energivores.

The campaign design has received various awards at Belgian, European and international levels and – which is far more important – it has already attracted more than 1 500 000 visitors to the website.

9.4.5. De TopTen website

TopTen is a website (www.topten.be) which allows the most energy-efficient products to be found quickly and easily for the home and at the office. It offers an overview for a whole series of products (domestic appliances, lighting, cars, circulation pumps, printers, PC and TV screens) of the most economical models on the Belgian market. It also provides an overview of the suppliers of green electricity. The website is an initiative run by the Bond Beter Leefmilieu Vlaanderen vzw with the cooperation of the Brussels Capital Region, the non-profit association Ecoconso and the European Commission.

9.4.6. Rational use of energy

A whole range of premiums are available to the public or to firms for energy-saving investments (insulation, windows, energy-efficient household appliances, boilers, etc.) and for the installation of photovoltaic or thermal panels or heat pumps at regional level or even provincial and municipal levels. The systems vary depending on regional policy.

The Regions also make 'facilitators', information desks and websites available to the public.

The Fund for the reduction of the overall cost of energy (FRGE) also offers loans at preferential rates to families on low incomes to allow them to have access to these technologies.

The federal authorities make available to those who are involved in construction or renovation projects a portal (http://www.belgium.be/en/housing) which sets out the relevant legislation (permits, standards, etc.) and available assistance (subsidies, reduced taxes and VAT, etc.).

Via media campaigns (in Wallonia, partnerships have been concluded with thematic TV broadcasts with large audiences, such as '*Une brique dans le ventre*' or '*Clé sur porte*'), advertising, brochures, internet sites, digital or paper information bulletins, open days to view exemplary buildings, presence at building and renovation trade fairs and exhibitions, etc., the Regions devote permanent attention to the rational use of energy and to environmentally-friendly energy generation. The objective is:

- raising awareness and changing behaviour with respect to rational use of energy;
- promotion of investments in energy-saving and environmentally-friendly energy production;
- communication of the regulations and financial support measures.

The Flemish Region offers a rapid calculation tool via the website www.energiesparen.be/energiewinst for the most worthwhile energy-saving investments: roof insulation, high-efficiency glazing, wall insulation, solar boiler, photovoltaic solar panels and the replacement of old central-heating boilers. The calculators take account of the usual investment costs, energy prices and energy premiums.

Under the Flemish Region's 2020 Energy Renovation Programme, the focus is placed on the priority investments of roof insulation, the replacement of all single glazing by high-efficiency glazing and the replacement of all central-heating boilers. Following on from this, the emphasis is placed on the post-insulation of walls. A fully-fledged quality system has been devised for the post-insulation of cavity walls. In June 2013, the first cavity wall open day was organised at various locations in Flanders.

9.4.7. Energy hunt

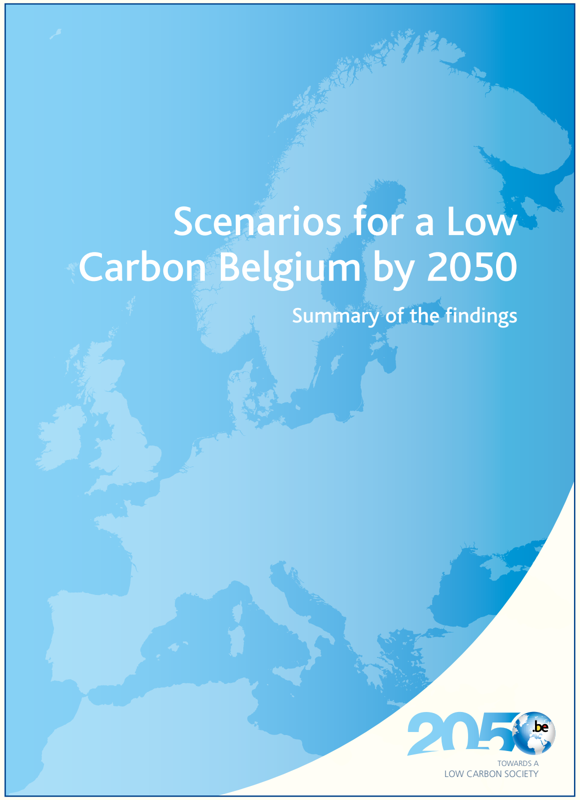
The Energy Hunt is part of the European campaign Energy Neighbourhoods (http://www.energyneighbourhoods.eu) in which 16 European countries participate. The Energy Hunt runs each year from 1 December to 31 March. During this period, the participants try to save as much energy as possible. To achieve this, however, the participants do not have to invest in new technologies: the project aims first and foremost to bring about changes in behaviour. For this reason, the participants of a neighbourhood meet from time to time to exchange practical tips for energy-saving and at regular intervals they measure their electricity, gas and water consumption. The meter readings are recorded on the project website which then calculates the progress made, taking into account differences in outdoor temperatures compared to the previous year. Individual participation is possible, but group participation is encouraged. Each group receives support from an energy expert, who receives training in energy-saving free of charge.

The first cavity wall open day in Flanders.

In the Flemish Region, the project is organised by Bond Beter Leefmilieu (the umbrella organisation of the Flemish environmental organisations), where the Energy Hunt has replaced the equivalent 'Climate Quarters' campaign since the end of 2010 (see 9.2.8). In the Walloon and Brussels Capital Regions, the project is organised at the end of 2013 under the name 'Energy Challenge' by the federation Inter-Environnement Wallonie in cooperation with Ecoconso, APERe, Ecores and Le Soir.

9.4.8. Toward a low-carbon society

The Walloon Air and Climate Agency organised a day in February 2012 to present two studies it had commissioned: '*Vers une Wallonie Bas-carbone*' (Towards a low-carbon Wallonia) and '*L'adaptation au changement climatique en Wallonie*' (Adaptation to climate change in Wallonia). This day was open to the public, administrations, consultancies, etc. The aim was to show that it is possible to achieve 80% to 95% reductions in greenhouse gas emissions by 2050 and how, through various scenarios, this reduction is possible. These scenarios and their impacts have been made available on line via the web calculator on http://www.walloniebascarbone2050.be/. The second study shows the consequences of global warming up to 2080. Two publications containing the results of these studies were also distributed. A first interdisciplinary Congress on sustainable development, organised by the Public Service of Wallonia and the French-speaking universities, was held in Namur on 31/1 and 1/2/2013. (http://www.congrestransitiondurable.org/)



The **Federal Climate Change Section** also launched a project on the transition to a low-carbon Belgian society by 2050 ('2050 Low Carbon Belgium').

This project covers various themes which are particularly important for the transition to a low-carbon society. The core of this project is the study 'Scenarios for a Low Carbon Belgium by 2050', in which various scenarios have been developed to reduce Belgian emissions by 80% to 95% compared to the 1990 figures by 2050. These scenarios were devised and analysed via a transparent open-source model based on intensive consultation with Belgian and foreign experts and stakeholders.

To make this theme and the results of this exercise more accessible to the general public, the Section also:

- drew up a brochure in 3 language versions (EN, NL, FR), presenting the results of the study 'Scenarios for a Low Carbon Belgium by 2050' in a comprehensible manner;
- developed a web tool to visualise all possible scenarios and their implications in the form of graphics. It offers users the possibility of devising their own scenario by themselves adapting the various parameters and driving forces which have an impact on

greenhouse gas emissions. Through this, the tool allows greater insight to be obtained into the various routes towards a low-carbon society;

- created a heading on the project ‘2050 Low Carbon Belgium’ on the climate website (www.climatechange.be/2050), including the results of the study ‘Scenarios for a Low Carbon Belgium by 2050’, the summarising brochure, the interactive web tool and graphical mapping (with additional information) of all local, regional and provincial initiatives in Belgium and Europe in the context of the transition to a low-carbon society.

9.4.9. Guidance for consumers: the Energy House

Since buildings, and especially housing, are the main consumers of energy and emitters of CO_2 in Brussels, they are a prime target for the policy conducted. In this context, Brussels Environment established the Maison de l’énergie – Energie Huis (Energy House – MEH) in 2011 to meet the need for proactive, full guidance to be given to all Brussels’ households to provide concrete assistance in undertaking sustainable action regarding their homes, whether in terms of behaviour, installation management or investment and finance.

The MEH offers the following services for Brussels households:

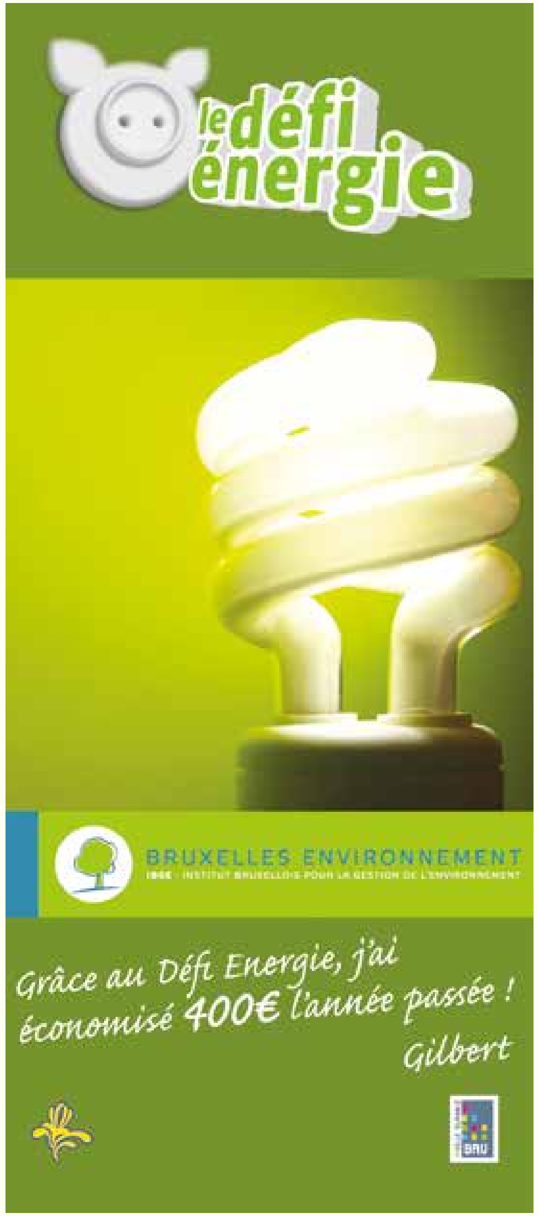
- ongoing provision of information and advice on the rational use of energy, eco-construction (ecological materials, green roofs, etc.), renewable energies, regulations and works to boost energy and environmental performance;
- proactive guidance, especially via home visits, concerning behaviour and management of installations, identification of energy-related renovation which is simple to carry out, immediate performance of small jobs, verification, where appropriate, of the proper performance of the works and the impact on consumption;
- technical, administrative and financial guidance.

The MEH consists of a **coordinating structure and local structures**. The coordinating structure, accommodated within Brussels Environment, provides the framework, financing and general coordination for the local structures, and is not therefore directly involved in the individual guidance of households. The local structures are separately and independently managed structures, in the legal form of non-profit associations, with the objective of providing guidance for households in the improvement of the energy and environmental efficiency of their homes. The Brussels Region is covered by six local structures so as to offer a service close to the population. The coordinating structure ensures the development and management of expertise, methods and studies for the benefit of the local structures: development of solutions and responses to the specific questions of these structures, development of methodologies and strategies for the recruitment and guidance of households, legal and financial expertise relating to the guidance of the households, training of teams set up, design and implementation of work tools, etc.

Apart from the MEH, Brussels Environment supports local and regional initiatives for the information and guidance of households, via subsidies, including in particular:

- The information service for private individuals of the non-profit association *Agence Bruxelloise pour l’Energie - le Centre Urbain* which offers increasingly specific advice to individuals in fields such as energy, renovation in general, eco-construction and acoustics, building stock and town planning and which also organises a large number of conferences and training on these topics.
- The *Point Info Energies Renouvelables*, which offers information on renewable energies via an info point, a documentation centre and a forum on the internet.

As a complement to the actions developed by the local structures of the MEH, the Brussels Capital Region is continuing ***Le Défi Energie*** (Energy Challenge), which is a programme aiming to encourage behaviour for the rational use of energy which does not require major financial



investments among Brussels households, both tenants and owners, whether aware or not. The participants undertake, on a voluntary basis, to make simple practical gestures to reduce their energy consumption both in the home but also that linked to the use of a motor vehicle. An internet site (www.defi-energie.be) allows monitoring to be carried out (via regular readings of the meters), which allows the trend in energy consumption to be measured.

9.4.10. Guidance for professionals: exemplary buildings, the PLAGE programme, facilitators and a practical guide

Call for projects 'exemplary buildings'

The Brussels Capital Region continues each year to launch a call for projects to design and construct *Exemplary Buildings* in terms of energy and the environment, which is receiving increasing international acclaim. The purpose of the *Exemplary Buildings* competition is to show that it is possible to achieve very high environmental efficiency with new or renovated constructions (for further details on this subject, see the previous National Communication).

The 4 calls for projects made between 2007 and 2011 have enabled the selection of 156 projects, i.e. more than 372 000 m² of exemplary buildings constructed or renovated, of which 3% private housing, 30% collective housing, 40% offices and shops and 27% public utilities. Of these, all uses together, 340 buildings (over 40% of the area of all the exemplary buildings) have been constructed or renovated according to the passive standard. The other buildings comply with at least the low, and even very low energy standard, depending on the sector and the type of project (construction or renovation). Three quarters of the projects also produce renewable energy.

The 2011 call for projects was characterised by the appearance of a block of flats, sport facilities and a mosque, which meet the objectives of Exemplary Buildings. The 2012 call for projects gave rise to more mature dossiers in terms of sustainability and a remarkable breakthrough of large-scale building projects from the property development sector.

In 2012, **Wallonia** launched the call for projects 'Exemplary Buildings of Wallonia', which also aims to show that it is technically feasible and economically viable (or close to viability) to construct and/or renovate exemplary buildings in Wallonia. 72 projects were submitted, representing 24 336 m² of heated floor. At the end of the examination carried out by a panel of experts, 23 award-winning projects were selected, representing 7 415 m² of heated floor. They will receive financial assistance shared between the developer and the designer of the project. The designers and developers will also receive technical support free of charge to assist them to achieve the quality objectives and promotion (via publications, press campaigns, internet presence, visits, seminars, etc.). A new call for projects was launched in June 2013. This competition will select tertiary buildings (buildings intended for educational purposes, office blocks or service buildings) which impress by meeting a series of criteria among which energy plays a dominant role.

The calls for Exemplary Buildings of Wallonia projects take over from the action 'Construire avec l'énergie' (*Construct with energy*), which was terminated at the end of 2011, when its requirements, which initially aimed to encourage 'doing better' than the regulations on energy efficiency of buildings, had been almost caught up with by the latter.

Call for 'PLAGE' projects

The programme '*Plan Local d'Actions pour la Gestion Energétique*' (Local Action Plan for Energy Management' – PLAGE) is a support programme for those responsible for large building stocks (essentially public authorities so far), aiming to improve the energy efficiency of the building stock for the benefit of the environment and the finances of the institution. The idea is to introduce a new energy culture in the management of buildings and infrastructure. Calls for projects are launched regularly. The projects selected receive methodological and technical support through an expert being made available (the Energy Manager) for a period of four years.

The energy efficiency methodology on which the PLAGE projects are based consists of four stages, developed and followed by the Energy Manager:

1. drawing up of an energy consumption survey
2. drawing up of a specific action plan with the key persons involved of the institutions and introduction of energy accounting
3. implementation of the action plan
4. monitoring of energy consumption, regular evaluation and communication of the results.

Since its launch in 2005, PLAGE has permitted an average annual reduction of 16% of fuel consumption and 10 000 tonnes of CO_2, a stabilisation of electricity consumption and a saving of about EUR 4.25 million per year. PLAGE was implemented until mid-2013 in 15 municipalities, 5 hospitals, 2 collective housing corporations and 6 social housing corporations (22 650 accommodation units) as well as in 70 schools in Brussels. This represents about 1380 buildings (315 of which are priority) and 4.5 million m², of which 2 million directly concerned by PLAGE action plans.

The success of the PLAGE methodology is such that the Brussels Regional Parliament decided to make PLAGE compulsory from 2015 for privately owned building stocks exceeding 100 000 m² and for publicly owned building stocks exceeding 50 000 m². Its success as an energy efficiency methodology is currently recognised by Europe under its EUSEW Awards, in which the project has been classified among the top five finalists in two categories.

Facilitators

The Sustainable Building Facilitator Service, introduced by Brussels Environment and the **Brussels Capital Region**, consists of a network of energy specialists recognised for their expertise resulting from the implementation of a large number of projects both in Brussels and abroad. Their task is to guide developers and building managers independently and impartially with regard to control of energy consumption, rational use of energy and promotion of renewable energy sources, at all stages of progress of a project. This service is currently composed of a first line of general advisers which in turn is supported by specialists replying to the more specific questions depending on the different sectors (energy performance of buildings, tertiary, collective housing, cogeneration, renewable energies, eco-construction and passive).

The developers and non-residential building managers in **Wallonia** can also benefit from the guidance of the Facilitator for the rational use of energy in non-residential buildings, whereas private individuals can contact the Energy Info Points for neutral advice free of charge (see 9.4.1).

Practical guide for the sustainable construction and renovation of small buildings

In response to the need identified for construction professionals to be able to find information on sustainable construction which is objective, independent, validated, practical, comprehensible and takes account of their entire construction project including the economic aspects, a practical technical guide was drawn up to assist in the design for the sustainable construction and renovation of buildings in Brussels.

9.4.11. Assistance to disadvantaged groups of residents to help them make rational use of energy

In the **Flemish Region**, more than 30 organisations in the social economy are taking part in the *Energiesnoeiersproject* (Energy Savers project) (www.energiesnoeiers.net). KOMOSIE vzw (the umbrella organisation for environmental entrepreneurs in the social economy) is the umbrella organisation for all these energy-saving firms. Energy Savers are low-skilled workers in the social economy who are trained to carry out energy-saving measures. These energy-saving measures are preferably carried out for socially and financially vulnerable target groups. The Energy Savers are not set to work unprepared. To guarantee the necessary quality and professionalism in implementation, they are employed and guided by a social economy organisation: the *Energiesnoeiersbedrijf* (Energy-saving firm). The main activities carried out by the Energy Savers are: free energy scans, insulation of sloped roofs and attic floors and the performance of a package of 'small energy-saving measures'. The project is linked to the social energy policy of public social assistance centres and municipalities. Important partners in the project include municipalities, public social assistance centres, building firms, provinces, distribution network managers, social rental agencies and social housing corporations.

In the **Walloon Region**, the Public Social Assistance Centres (CPAS) may receive subsidies to provide social guidance in energy. They inform people about rational use of energy and about taking control of consumption. They conduct preventive and curative measures in these domains and spread information aimed at facilitating access to existing financial assistance. The CPAS can also consider pre-financing certain aids to investment. Within the Union of Cities and Municipalities of the Walloon Region, a Social Unit for Energy was established to deal with various issues linked to energy: gas, electricity, Social Heating Oil Fund, social guidance in energy matters. This unit advises the members, collects information, establishes a repertoire of good practices, develops training sessions and plans visits. For the period 2010-2012, 113 plans were accepted, 30 for the period 2011-2013 and 97 for the period 2012-2014.

In the **Brussels Capital Region**, a versatile social guidance project in the energy sector known as '*Service Energie*' (Energy Service) has been introduced. It is run by the Federation of Social Service Centres and has a three-fold objective:

- As a priority, to respond to the various needs of the users of the Social Service Centres regarding energy and water through customised monitoring.
- To ensure the communication of energy skills to social assistants in these Centres, in order to enable them to acquire a series of 'energy reflexes'.
- To study the possibility of extending the Energy Service to other social assistance sectors in Brussels so that a larger number of people can benefit from it.

The Energy Service focuses on vulnerable households and adds a social aspect to household guidance in relation to the guidance offered by the MEE, which is intended for the general public.

http://www.fdss.be/index.php?page=guidance-sociale-energetique

Since 2011, there has been an Energy Support Centre, which is complementary to the Energy Service and which has the main task of acting as a reference structure for questions of social workers of the associative sector regarding energy, with a view to enabling them to deal with these problems.

9.4.12. The Passive House Platform

The '*Plateforme Maison Passive*' (PMP) and the '*Passiefhuis-Platform*' (PHP) are two independent, neutral organisations with the task of encouraging the construction of buildings with very low energy requirements, based on the concept of the passive building. They distribute information (website, newsletter, brochures, dynamic tools, PHPP programme,[58] etc.) and provide training, expert evaluations and guidance, to both professionals and private individuals. The PMP and the PHP are bodies which certify passive buildings in Belgium and which jointly organise the exhibition and annual symposium 'PassiveHouse' in Brussels. The PMP and the PHP contribute actively to establishing standards related to energy in buildings and carry out cutting-edge research (thermal bridges, tertiary sector, life-cycle analyses, etc.).

9.4.13. Energy efficiency certificates and audits

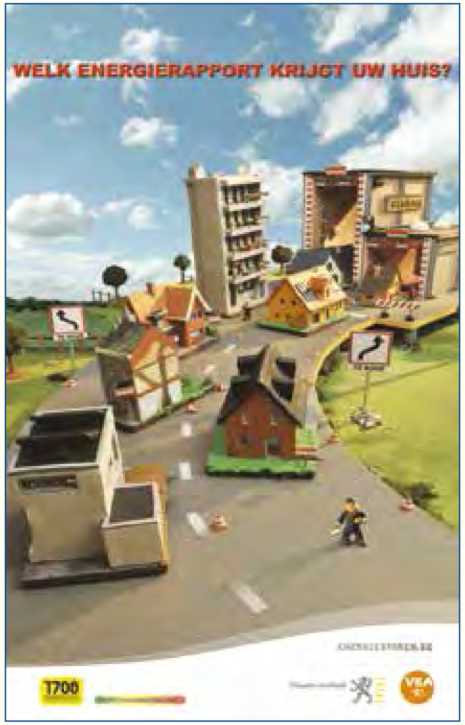
It is often possible to save a great deal of energy quite simply in a house. It must first be investigated where the major energy-guzzlers are to be found. As soon as they are known, measures and solutions can be sought to cut energy consumption.

Since 2009, it has been compulsory for an energy efficiency certificate to be drawn up on the sale or renting out of housing. This certificate contains a great deal of information concerning the main energy-saving measures that are possible in the dwelling.

In the **Flemish Region**, everyone can check on the website www.energiesparen.be/testuwepc how well or badly a dwelling scores compared to other dwellings.

Anyone wishing to carry out further investigations concerning energy-saving can have an energy audit carried out. This audit responds to the questions of where, how much and how energy can be saved in a home. The audit investigates the energy aspects of the envelope of the building, the heating system and the hot water production. The ventilation can also be examined as an option. The Flemish Region has devised an accreditation scheme for energy experts for housing. This provides private individuals with the assurance that the advice given is reliable. In addition, the authorities have developed a computer application, which must compulsorily be used by this accredited energy expert, who has followed specialist training to use this application correctly and to be able to give sound energy advice.

[58] PHPP = '*Passiv-Haus Projektierungs Paket*', which can be translated as 'Programme for the design of passive houses'.



The cost of this in-depth energy audit means that it is not affordable for everyone. For this reason, the Flemish Government created the free energy **scan**. This is a rapid screening of the energy consumption in a home. A simple inspection of the home gives a first impression of the energy situation and the possible energy saving in the field of insulation, heating, lighting, household appliances and energy efficiency. The person performing an energy scan at the same time carries out a number of small energy-saving measures. The network managers are obliged to carry out a limited number of household energy scans. They agree with the municipalities who carry out the energy scans: the municipality itself, the network manager or a third party. In this respect, there is often coordination with the Energy Savers. Each participating municipality defines a target group. The Flemish authorities ask for priority to be given to low-income households.

In the **Brussels Capital Region**, a regional subsidy also exists for carrying out a detailed energy audit. Moreover, private individuals can apply for an energy audit free of charge via the local sections of the Maison de l'Energie et de l'Ecoconstruction, comprising a simplified energy diagnostic analysis of their home and their behaviour, which will lead to the identification and technical-financial evaluation of the investments to be carried out to reduce their energy consumption.

Since 2012, large commercial buildings and industrial sites, which are heavy consumers of energy, have to carry out an audit on renewal or extension of a 1B environmental permit. This new measure was the subject of a detailed communication to permit holders, the business world and energy specialists.

In **Wallonia**, since its launch in 2006, the energy audit, better known as the PAE audit, has provided assistance for more than 28 000 households in making the most appropriate choices to renew and improve the energy efficiency of their homes. With the help of their accredited auditor (there are more than 800 of them in 2013 in Wallonia), these owners were able to receive objective assistance and precise advice to improve the insulation of their homes and to renew or improve their heating, hot water and ventilation systems.

Whereas the housing stock in Wallonia is very varied with housing converted into multi-family dwellings, flats and blocks of flats, the PAE audits were confined to houses. Wallonia therefore adapted the procedure so as to audit all existing housing under the PAE 2. The procedure was finalised in 2012 and the first PAE 2 audits are expected to be carried out in September 2013.

Each PAE 2 audit will comprise two scenarios of improvements composed of different recommendations concerning the insulation, the heating and hot water systems, use of renewable energy and ventilation systems. In addition, in order to take account of technological developments, the PAE 2 audit will include heat pumps, cogeneration systems and photovoltaic solar panels. Finally, the new PAE 2 audit will be able to take account of the applicants' extension plans (e.g. conversion of the loft into a bedroom, conversion of an unheated annex into a kitchen, etc.) so that the improvement works of the two scenarios proposed by the auditor are consistent with these plans.

Carrying out a PAE or PAE 2 audit gives rise to a regional premium and gives entitlement to certain premiums (for wall or floor insulation) or increases in premiums.

9.4.14. Energy consultants

In the **Flemish Region**, energy consultants are made available with government support to various sector federations and non-commercial organisations to raise the awareness of their target groups, to inform them and guide them in the field of energy-saving and environmentally compatible energy production. There are energy consultants who focus on building professionals, families, SMEs, farmers, immovable property, the tourist sector, etc.

The **Brussels Capital Region** has provided specific training for 'building energy managers' since 2004. Various topics are covered from the point of view of energy efficiency and financial viability.

Wallonia has for many years organised a basic training course for Energy Managers. This training course is accessible to all persons who, in their business or public or private tertiary sector institution already have to manage the energy aspects of the property of the establishment or institution employing them or will have to do so in the future. The subjects covered include the entire range of the concerns of the 'Energy Manager' from controlling the energy bill to recourse to alternative sources of energy, via questions specific to performing this duty:

- energy measurement and management;
- improvement of energy efficiency of buildings and equipment;
- raising the awareness of the occupants.

This training course consists of 13 days of training. Since 2003, at the end of the training course, the participants undertake a certification procedure to assess their knowledge and skills to carry out projects for sustainable control of energy on site. As a result, 54 and 49 trainees respectively completed the course successfully in 2009 and 2011.

Moreover, Wallonia is making Facilitators available to various target populations.

The Facilitators for rational use of energy in non-residential buildings and the Facilitators for the rational use of energy in industrial processes offer the managers of non-residential buildings and businesses:

- an analysis of the energy situation of their site
- information on the best technologies
- an appropriate methodology for their problem
- information on the regulatory context and financial aid
- consultants or equipment suppliers
- targeted training.

In addition to the Facilitators for rational use of energy, Wallonia has also entrusted various Facilitators with conducting information and advice campaigns to assist in the harmonious development of projects in the various renewable energy networks.

Building designers can also count on guidance from 'Energy Efficiency of Buildings' Facilitators, entrusted by Wallonia with conducting information and advice campaigns for professionals to assist in the implementation of the regulations on the energy efficiency of buildings.

The Energy Education Facilitator provides guidance for schools wishing to raise pupils' awareness of energy issues (see 9.6.7).

9.4.15. 'Energy-ethical' municipalities

In order to support the actions by the municipalities with a view to defining a true policy for sustainable energy control at local level, the plan '*Des communes énerg-éthiques*' (Energy-Ethical Municipalities) to finance energy advisers in the municipalities was launched on 9 May 2007.

Following the call for applications, 95 municipalities were selected and receive the assistance of 66 energy advisers. The latter receive training organised by the Union of Towns and Municipalities of Wallonia. They also receive technical and legal support.

The results at 30 June 2010 of the energy advisers is as follows:

- 91 municipalities are drawing up their energy survey and 51 of them are complete;
- 87 municipalities are establishing their energy accounting and 48 of them are complete;
- 593 municipal buildings have been the subject of an energy audit;
- 812 corrective measures have been taken in relation to the installations of municipal buildings since the arrival of the energy advisers;
- the energy advisers have examined 1 066 investment plans in municipal buildings, 41% of which relate to heating systems, 36% to the building envelope, 12% to the lighting system and 11% to the use of renewable energy;
- the energy advisers have examined nearly 8 600 town planning permit application dossiers to check compliance with the thermal insulation and ventilation standards;
- the energy advisers have responded to more than 21 100 inquiries by citizens during the information sessions they organise for them;
- the energy advisers have established nearly 1 250 direct awareness actions for citizens, 67% of which take the form of written awareness (flyers distributed to all mailboxes, articles in the municipal bulletin, heading on the municipality's website, newsletter, etc.) and 33% of them taking the form of information sessions, stands during local events, etc.

9.4.16. The 'Eco-dynamic Enterprise' label

The 'Eco-dynamic Enterprise' label (coordinated by Brussels Environment) is a regional public certificate conferred for a period of three years on organisations (enterprises, associations, administrations), which voluntarily undertake to implement an environmental management system based on the principle of ongoing improvement in all environmental fields, including energy and mobility. The selection criteria include the existence of energy accounting, technological choices with respect to air-conditioning and energy consumption, encouragement of energy-saving behaviour, solutions involving replacement of private vehicles, etc.

9.4.17. Eco-construction

The three Belgian Regions and the construction sector have undertaken to draw up a benchmark for the labelling and certification of sustainable buildings which will quantify the sustainability of the buildings in the form of thematic scores, which will allow an overall score to be calculated for the building. The purpose of this labelling and certification is to put an end to 'green-washing' and to assist the general public in differentiating between the buildings with genuine sustainable achievements from those where the sustainability is confined to the sales arguments.

In the **Walloon Region**, three clusters (eco-construction/Tweed; sustainable energy/Cap 2020; sustainable construction) address architects, entrepreneurs and producers of materials. The clusters are places of exchange, value creation and encouragement of innovation.

The **Brussels Capital Region** also offers a dynamic support of exchange and information in the sector of eco-construction thanks to the Ecobuild Cluster. It also supports the technological guidance in eco-construction and sustainable development conducted by the Scientific and Technical Committee for Construction, in cooperation with the Construction Confederation of Brussels Capital. The aim of this guidance is in particular to promote and favour the transfer of innovations in order to respond to the new needs, requirements and expectations in these fields. It is offered free of charge to professionals in the construction industry of the Region, i.e. not only to construction firms, but also to all the actors upstream (manufacturers or distributers, architects, consultancies, authorities, etc.).

In the Flemish Region, a transition arena is active with regard to sustainable living and building, better known as DUWOBO. DUWOBO consists of stakeholders such as banks and other financiers, housing producers, the authorities, NGOs, knowledge centres and research institutes, federations and producer organisations. The platform is organised very interactively and in the first instance has the task of tracing out an innovation course in the field of sustainable living and building for the next 20 years. The platform can serve as a knowledge centre and hub, launch proposals for the public authorities and encourage complementary actions for sustainable living and building. The platform can initiate and implement wide-ranging innovations by bringing together actors from the business community, social organisations, the academic world and the public authorities and providing information via publications, consultation and the media. A knowledge platform of this kind will also be an instrument in eliminating one of the most significant bottlenecks for sustainable building in Flanders, i.e. the fragmentation of both knowledge and fields of competence.

9.4.18. Energy Champion competition (2011-2012)

The Flemish Energy Agency, together with the Brussels and Walloon Regions, APERe (Association for the Promotion of Renewable Energies) and Bond Beter Leefmilieu, entered into a partnership for the competition in which they went in search of the Belgian municipalities with the best energy policy.

The Energy Champion competition is based on the European Renewable Energy Sources Champions League (www.res-league.eu).

This competition had various aims:

- to promote the use of energy from renewable sources;
- to establish dynamic competition between the municipalities and invite them to work on a wide-ranging local climate policy;
- to compare and encourage local initiatives and good examples with those of other municipalities, regions and elsewhere in Europe;
- to give a higher profile to local administrations and their projects at Belgian and European levels;
- to ensure promotion for operators in the field of sustainable energy;
- to organise an event on renewable energy;
- to bring those selected from the three Belgian regions together to work towards a common objective.

Number of participating municipalities: 67

Number of municipalities registered on the study day: 22

Number of municipalities having signed the Covenant of Mayors: 16

9.4.19. Energy Knowledge Centre for Agriculture and Horticulture

The Flemish Region has established a permanent structure for energy consumption in agriculture and horticulture. An adviser provides information on rational use of energy and the new energy technologies in the broad sense (technical and administrative information). A second activity is the ‘technology watch’ and monitoring the market for available technology.

9.5. Raising awareness of mobility

9.5.1. Promotion of sustainable mobility

In the **Flemish Region**, active efforts are being made in awareness-raising and communication to achieve a change in behaviour concerning the choice of transport. In many cases with assistance from the public authorities, all kinds of campaigns have been devised, such as the annual Mobility Week (http://www.weekvandemobiliteit.be/), '*Met Belgerinkel Naar De Winkel*' (Ringing the Bell to the Shops' (http://www.belgerinkel.be/), car-free Sundays, the sustainably to school project (http://verkeer.sg-schot.be/), *Sam de Verkeersslang* (Sam the Traffic Snake) (http://www.verkeersslang.be/), projects involving car and bike sharing, the Flemish Bicycle Week, etc.

In addition, the Pendelfonds (Commuting Fund) subsidises projects promoting sustainable home-to-work journeys, the Mobile Undertaking Prize awards each year to public and private undertakings which make a positive contribution to the community in the field of sustainable mobility, awareness-raising and information campaigns are organised regularly in the field of public transport (bus, train and tram), etc.

In **Wallonia**, the town of Namur offers town bikes for hire. The Public Service of Wallonia has also equipped itself with bikes for its employees. The Mobility Planning Department coordinates the mobility plans, grants incentive loans, organises the training of the Mobility Advisers, manages a Mobility Documentation Centre, takes charge of the publication of specialised magazines and good practice guides and mobility surveys. It organises various awareness-raising and educational actions, including the Mobility Week and Mobility Spring, offers a Mobility Portal and acts as moderator for social networks. It grants assistance to a large number of operators engaged in the development of activities aiming to optimise mobility management in Wallonia and the implementation of the Walloon Map for cyclists (in cooperation with the Department for environmentally-friendly travel and municipal partnerships of the operational Directorate-General for roads and buildings).

The **Brussels Capital Region** has since 2006 been recompensing Brussels residents who return their number plate with the *Brussel'Air* premium and organises various actions with a view to reducing pollution generated by road transport, encouraging alternatives to cars and improving environmental performances of the vehicle fleet:

- **The Company Mobility Plan**. Any enterprise employing more than 100 people on the same site in the Brussels Region is legally obliged to draw up a company mobility plan with compulsory measures, such as employee awareness-raising actions, to establish sufficient bicycle parking facilities, to take account of the Eco-score when buying or leasing cars and to make a multimodal access plan available;
- **Guidance for schools in drawing up a school mobility plan**
- **The Bike Experience campaign** (replacing the Friday Bike Day campaign) has the aim of encouraging Brussels residents to cycle to work, by borrowing bicycles and the possi-

bility for those not yet used to cycling in town of receiving the assistance of a Coach who accompanies them and gives them good advice for a few days (www.bikeexperience.be).

- **The Mobility Week**. During this week, various awareness-raising actions are organised based on sustainable mobility, such as Car-free Sunday and the day at work/school without a car.
- **Publication on the internet of the 'active modes' map**. This map includes a whole series of information intended for cyclists, but also for pedestrians.
- **The 'Villo' bike hire scheme**: +/- 4000 bikes can be hired from 300 stations distributed in the town;
- **The organisation of Cyclovia days**. These days offer the possibility to residents to rediscover their city by bike and to see the human aspect of their capital, without a car; on this occasion, routes are equipped and signposted in the town for cyclists and are prohibited to cars for the duration of the event.

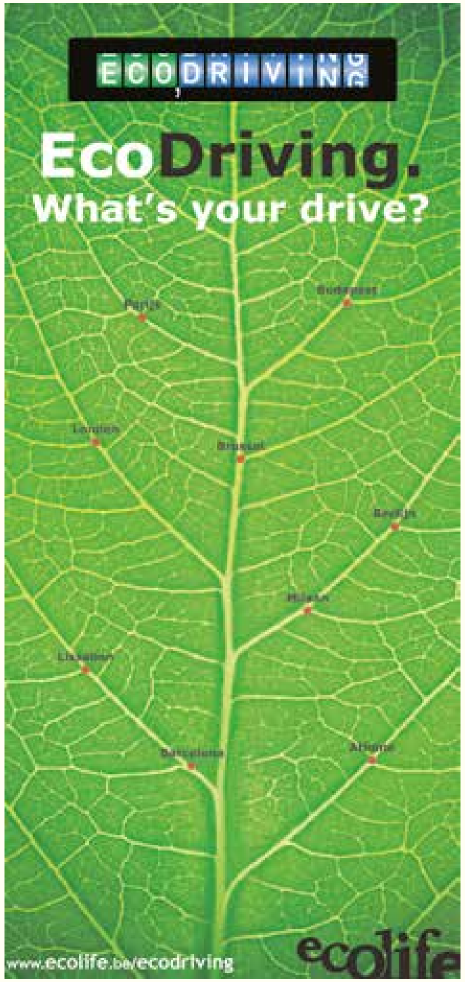
Energy challenge. In this context, a specific commitment is proposed to households with one or more vehicle(s): save fuel by avoiding short journeys by car or, by adopting flexible behaviour, try moving around by other means (therefore bicycles are made available).

9.5.2. Eco-driving

Training is proposed to promote a driving style which is a respectful of the environment.

In recent years, the authorities and NGOs in the **Flemish Region** has implemented various projects focusing on energy-saving driving methods or projects that include energy-saving driving methods. The campaign '*Rustig Op de Baan*' (Calm on the Road) of the Flemish authorities (http://www.ikbenrob.be/) has already borne fruit. For professional drivers, training courses are available via the Flemish Employment and Vocational Training Department (VDAB), accredited training centres and the accredited driving schools. The drivers working for the Flemish public authorities and all instructors and drivers of the Flemish transport company De Lijn (public transport by bus and tram) will follow eco-driving training. At the same time, the buses are equipped with driving style meters. Under traffic education projects financed by the Flemish authorities, including on the initiative of or devised by the Flemish Foundation for Traffic Engineering, the necessary attention will be paid to the principles of energy-saving driving methods. In addition, vehicle parameters which have an influence on emissions, such as load, tyres, etc., are also covered.

The non-profit association Ecolife is also active in this field. The Eco-driving training offered by this environmental NGO is an interactive workshop with realistic driving simulators. Ecolife brings five driving simulators for this purpose to local authorities, companies and non-profit organisations in any location within Belgium. The Eco-driving training is a combination of explanation and practical exercises under the guidance of an experienced mobility coach. The participants are given a three-hour training session in Eco-driving principles. In groups of up to 15 persons, each participant can test his/her ecological driving style by completing a virtual route on the simulators. More info: www.ecolife.be/ecodriving.



In the **Brussels Capital Region**, information stands on eco-driving are organised during events and training sessions on eco-behaviour are part of the training of bus drivers of the Brussels transport company STIB.

In the **Walloon Region**, centres of competence in transport and logistics of the Forem, in collaboration with the training centres for heavy lorries and buses of the Forem, propose to put in place specific training modules dealing with eco-driving. For its part, the TEC group already trains his drivers in eco-driving.

9.5.3. Raising awareness about purchase of vehicles which economise on energy

Despite the efforts, no political agreement has been reached on tightening up the law regarding information on CO_2. Co-operation between the public authorities and the sector has allowed a substantial improvement, but it is still theoretically insufficient.

The annual publication by the Federal Government of the '*Guide CO_2 de la voiture - Roulez économe… un plus pour vous et la nature*' (CO_2 Guide to Cars – Drive economically…a plus for you and for Nature) enables citizens who wish to purchase a new vehicle to have objective information comparing the various models available on the Belgian market. The guide lists for each model, the category of CO_2 emissions (from A to G), CO_2 emissions in g/km, fuel type, consumption, etc. At the end of 2012, the last paper guide was published. However, this guide is also permanently available in electronic version – the database of which is updated monthly - via the energy-guzzlers website (www.energievreters.be/auto).

In the **Flemish Region**, the necessary communication campaigns are set up on this subject. Awareness is naturally very important to encourage consumers to opt in favour of an environmentally-friendly car and energy-efficient tyres. A communication campaign provides clarity for consumers (citizens, but also fleet managers, firms and leasing companies) concerning the environmental compatibility of a vehicle. In this respect, it must be clear that not only does CO_2 play a role, but also air-polluting emissions and noise. The campaign provides objective information in an accessible way concerning the environmental properties of cars, as well as on the possibilities and the present market for the so-called new vehicle technologies (hybrid, plug-in hybrid, electric and fuel cell (hydrogen) vehicles, but also (compressed) natural gas-fuelled cars). In 2013, for example, the campaign 'pay attention to the label' (www.letophetlabel.be) has been launched for more energy-efficient, safer and quieter tyres.

9.5.4. Ecoscore

In the **Flemish Region**, information relating to energy consumption and to vehicle emissions is disseminated via vast information and awareness-raising campaigns, as well as via training for car sellers. For instance, the environmental evaluation Ecoscore was communicated to the public and to those owning fleets via a brochure, a flyer, a radio spot, streamers on websites and articles in all sorts of periodicals. The Ecoscore of a vehicle gives the overall environmental score, independently of the technology, taking account of the emissions released in the fuel or electricity production and taking account of greenhouse gas emissions, air-polluting emissions and engine noise. An Ecoscore between 0 and 100 can be assigned to every vehicle. The closer a vehicle approaches 100, the more environmentally friendly it is.

ecoscore

The **Walloon Air and Climate Agency** and the **Brussels Capital Region** also finance Ecoscore. In addition, the Walloon Region decided to promote the purchase of less-polluting cars (new or second-hand) than the replaced vehicles through the ecobonus/ecomalus scheme. This scheme has been in place since 1 January 2008. The Public Service of Wallonia, under its sustainable development plan, has purchased some electric vehicles which are clearly identified to advertise this alternative to the traditional car, when they are driven.

9.5.5 Logistics consultants

In the Flemish Region, logistics consultants are made available free of charge to firms. The consultant has the task of providing medium-sized enterprises proactively with neutral information, increasing their awareness and guiding them in their logistics activities. The adviser examines, together with the firm, the possibilities concerning, inter alia, co-modality, green logistics, combining of goods flows, bulk consignment and optimisation of transport movements over time.

9.6. Education and training

In Belgium, education comes under the jurisdiction of the Communities: the French, Flemish and German-speaking Communities.

In the official primary and secondary education, the theme of climate change is generally treated in a transversal manner, incorporated in the broader programmes relating to nature and the environment or sustainable development. Nature and environmental education is today firmly anchored in the Belgian educational system. Its pedagogical objectives rest on four stages: discovery, understanding, assessment and action. Starting from what the person has experienced, the methodology prioritises active pedagogy, direct contact with life and an eco-system approach.

Some activities of education in sustainable development, both inside and outside the school, are conducted by a growing number of actors in society.

9.6.1. Educational climate dossier for primary education

In 2011, the *Walloon Air and Climate Agency* took charge of a third reprint of the French version of the educational dossier Le climat, c'est nous (We are the climate). This educational dossier – together with its Dutch language version *In de weer voor het klimaat* – was launched in January 2007 as a result of cooperation between the Federal Climate Change Section and the WWF, and was based on a dossier already developed by the WWF in 2002 at the request of the Walloon Region.

This dossier is addressed to teachers, pupils of the final years of primary school and the first two years of secondary school (10-14 year-olds). The binder file contains some twenty theme sheets, composed of information sheets for the teacher and prepared work sheets for pupils. The interrelationship between our lifestyle, climate change and biodiversity is dealt with interactively and the attempt is made to work mainly towards solutions. In total, 5 800 copies have been distributed in French and Dutch. http://www.climat.be/dossier-educatif.

9.6.2. Educational climate website for secondary schools

As a successor to the educational dossier for primary schools (see previous item), the WWF, the Free University of Brussels (VUB), the Erasmus University College of Brussels and the North-South NGO Studio Globo, in cooperation with the Federal Climate Change Section, launched the website www.climatechallenge.be at the beginning of 2012 for the top four years of secondary schools (15-18 year-olds).

This is an attractive virtual, multidisciplinary learning environment, geared to both the Dutch-speaking and the French-speaking educational context, in which teachers and pupils find the necessary lesson sheets, video clips on climate issues or on practical solutions, video interviews with scientists and climate watchers, background information, etc.

Each project partner provided his/her own specific – and essential – contribution to the content and development of this package: knowledge of and expertise in climate issues, the education world in both regions, the communication of science, the north-south problem and world and intercultural education. An important aspect of this project is the impact of climate change on the population in the south.

9.6.3. The 'Climate Challenge Conference' in the European Parliament for secondary schools

The cooperation entered into by the WWF, the Free University of Brussels (VUB), the Erasmus University College of Brussels and the North-South NGO Studio Globo with the Federal Climate Change Section to develop the educational climate challenge project for secondary schools (see previous item) also led to two ‘climate conferences’ (on 23 March 2012 and 3 May 2013) in the European Parliament.

During these days, in each case over 300 secondary school pupils simulated the international climate negotiations for a whole day there. The pupils were assigned a country in advance which they had to represent during the meeting at the Parliament. The preparatory work in class allowed them to discover the economic, ecological and geographical situation of ‘their’ country to obtain good insight into the challenges for the negotiations they were going to conduct. Some twenty countries, including Germany, Qatar, Iceland and the United States, therefore met around the table to reach an agreement on 3 concrete resolutions in the field of aviation, food and a general climate agreement.

In the course of the discussions, views were put forward, amendments drawn up and alliances formed between countries. The debates were animated and some future parliamentarians showed signs of real orator talent. A fascinating experience in a realistic setting which achieved its objective: to make young people reflect on climate issues.

9.6.4. The MOS project (Respect for the environment at school)

MOS (www.milieuzorgopschool.be) is a project of the Flemish authorities on care for the environment from nursery to secondary school. The MOS project helps the school to develop its own environmental care scheme in a pedagogically responsible manner. An environmental care scheme at school is a set of measures and actions on which everyone works to make the school more environmentally friendly. Children and adolescents develop this environmental care scheme, tailor-made to their school, together with their teachers, management and school staff. MOS offers educational and practical support for this. The

concrete content of MOS is determined by the school itself. MOS works around the topics of waste, energy, nature, mobility and water.

9.6.5. Environmental Education Competition

Since the school year 2004-2005, a Competition has been organised for environmental education projects for ordinary and specialised secondary schools together. It aims for optimum raising of pupil awareness of this concept. The Competition prize-winners can receive pedagogical and financial assistance to complete their project. Over the years, the prize-winners are becoming human resources constituting a network of ‘Goodwill Ambassadors’. The Competition has been abolished since the school year 2010-2011.

9.6.6. The Forum on education on the environment and sustainable development

Education on the environment and sustainable development already occupies a prime position in the school. However, in view of the multiplicity of the supply and demand on the subject, it had become necessary to consider the situation as a whole and to agree to more strategic trends in education on the environment and sustainable development at school.

This was the aim of the Forum on education on the environment and sustainable development, which brought together the various actors within and outside the school world concerned: the pedagogical teams in the schools, from nursery to secondary level, the cabinets of the Ministries of Education and the Environment, the teaching administration services (AGERS) and the organisational powers, the environmental administrations in the Walloon and Brussels Regions and those for energy and mobility, the associations for education on the environment and sustainable development, etc.

The Forum had the objectives of:

- defining strategies for education on the environment and sustainable development which are shared and understood by the various parties and in this way better disseminated;
- lay the bases for better coordination and cooperation between the various levels of authorities and intervention, in and around the school;

- lead to concrete commitments essential for the implementation of these strategies;
- introduce a tool for monitoring and evaluating the commitments undertaken.

Concerning the results, a survey of teachers showed the difficulties of such activities, on the one hand. On the other hand, it singled out the topics tackled: mainly waste, food and water. In primary education, nature and garden are easier to tackle: energy and climate tend to be covered in secondary education.

The Forum on education on the environment and sustainable development project was set up on the initiative of the Ministers for the Environment of the Walloon and Brussels Capital Regions. The Réseau IDée asbl was entrusted with the task of coordinating it (http://www.assises-ere.be).

9.6.7. The Energy Education Facilitator

The Energy Education Facilitator, established in Wallonia for several years, works on energy efficiency in schools, dealing in parallel with the pedagogical and technical aspects.

The methodology of the participative audit of energy management in a school was perfected under pilot projects. The audit is carried out by the pupils with the help of measuring equipment and observation grids. The step to move from the school audit to improvement is presented in a guide intended for teachers.

9.6.8. Zero Watt Schools Competition

The first Zero Watt Schools Competition was organised in 2011 in Wallonia in partnership with the Sud Presse group and with the Energy Education Facilitators. This competition is directed at the schools in the basic education system which are asked to reduce their electricity consumption as far as possible over a period of 3 months in relation to the same period of the previous year. To assist them, guidance is given by the Energy Education Facilitators in Wallonia. The competition was organised for the second time in 2012 and was launched for the third time in June 2013.

9.6.9. Ener'jeunes

Ener'jeunes is an operation intended for 10 to 12 year-olds who are members of a Children's Town Council. Objectives: to make the young people aware of sustainable development and invite them to set up projects on the subject within their municipality. In 2013, the action is being organised for the 5th time.

9.6.10. Cooperation Agreement between the Walloon Region, the French-speaking Community and the Brussels Region

In order to facilitate the cooperation between the Walloon Region and the Fédération Wallonie Bruxelles, a cooperation agreement was signed in 2003 to establish a partnership structure between the administrations concerned. It also defines a series of priority objectives among which the multiplication of information channels, better incorporation of nature and environmental education in the school syllabus, the preparation of common and complementary activities, support for schools wishing to include Sustainable Development in their project, logistical cooperation and the setting-up of reciprocal exchanges for the purpose of improving pedagogical practices.

On 10 November 2011, a cooperation agreement on education concerning the environment, nature and sustainable development was signed between the French Community, the Walloon Region and the Brussels Capital Region. Through this Agreement, the three signatories, aware of the fact that they are striving for the same objectives, decided to join forces to promote and develop environmental education while placing it in the perspectives of sustainable development and civil education.

9.6.11. Raising environmental awareness

Apart from the services which it offers directly, the Directorate for Raising Environmental Awareness of the **Walloon Region** is continuing its collaboration with a range of associated partners who perform specific assignments providing information and are active in the area of nature and environmental education.

Each year the Walloon Region orders the writing of pedagogical materials by associations specialised in nature and environmental education. A first systematic hand-out is sent to the primary and secondary schools. On average, more than 10 000 hand-outs of documentation are undertaken each year. The majority of the documents are also downloadable on the site www.environnement.wallonie.be. On the occasion of the release of the Walloon Plan for the Air, a new document was prepared for teenagers.

Brussels Environment is developing pedagogical tools for teachers in Brussels schools in order to assist them to integrate the environment in their lessons in association with the core skills and to provide them with ideas for pedagogical activities to engage in with their pupils. These tools guide the teacher from the first awareness-raising action to the school project at all ages and covering a large number of themes (energy, ecological footprint, sustainable food, waste prevention, etc.).

Each year, Brussels Environment also offers animation organised by specialised animators with a view to an activity which combines acquisition of knowledge with gestures for the environment.

The Brussels Region is promoting the QUICKSCAN tool, developed by the non-profit association Coren, which enables a school to take stock of its situation with regard to education and the environment free of charge and then to receive a report drawn up by this non-profit association which will give it recommendations and very concrete directions to follow or initiate a sustainable approach within it.

9.6.12. Passport in eco-pedagogy

The Walloon Region allocates subsidies to the Institute of Eco-pedagogy (IEP), which dispenses pedagogical training in the field of nature and environmental education to teachers, animators and private persons and collaborates with the colleges in order to incorporate nature and environmental education in school programmes.

Since 2008, the IEP also offers the training package *Passeport en Eco-pédagogie* (Passport in Eco-pedagogy), an original training course to complement existing training and confers a certificate in eco-pedagogy practices.

9.6.13. The network of Regional Centres of Initiation to the Environment (CRIE)

Alongside their normal tasks as a public service for information, awareness-raising and nature and environmental education, the 11 regional environmental initiation centres (*Centres Régionaux d'Initiation à l'Environnement* – CRIE) of the Walloon Region provide an animation methodology and didactic scientific material for the general public. Their main activities include school animations, training courses, activities for families and holiday courses. They focus primarily on the young, although there are also courses designed for adults: teachers, animators, nature guides, citizens, etc. In addition, there are also guided walks, exhibitions, open days or conferences organised by the CRIE, i.e. an extensive range of activities in which the whole family can take part.

The CRIE carry out relatively few activities focusing explicitly on the theme of climate change. This subject is tackled more across-the-board in the activities of each CRIE which may take very different forms: animations, educational projects, training periods, birthdays, exhibitions, etc.

Given that the climate change issue is interconnected with a large number of other topics (biodiversity, energy, mobility) which are frequently tackled in the CRIE, it is therefore an underlying topic throughout the year.

From 2009 to 2012, the CRIE achieved over 63 000 hours of activities of all types (training courses, animations, events, etc.), in which over 650 000 different people took part. An ever growing number of people are received by the CRIE, with an average of 163 426 persons/year for the 11 centres.

9.6.14. Day of the Warm Pullovers

The initiative *Dikke truiendag (Day of the Warm Pullovers)* (www.dikketruiendag.be) was launched on 16 February 2005 – the day on which the Kyoto Protocol entered into force – under the aegis

of MOS (Milieuzorg Op School – Care for the Environment at School, see 9.6.4) and the Flemish Government. On this day the heating was lowered by 1°C to remind us of Belgium's commitments in terms of reducing greenhouse gas emissions and symbolically, pupils or employees of participating companies put on warm pullovers.

The Day of the Warm Pullovers has since then been organised every year in February. The Warm Pullover Day calls on everyone to pay attention to the major challenge of climate change. The campaign aims mainly for simple energy-saving measures which can also be maintained subsequently in a structural way.

9.6.15. Idea Network and Good Planet

The Idea Network (*Réseau Idée*) is the main centre of information for nature and environmental education within the Walloon Region and the French Community for the Brussels Capital Region. The network now has more than 100 members and its main objective is to strengthen ties between all the actors concerned: teachers and educators at all levels, community education workers, parents, environmental advisers, etc. All parties concerned are offered a wide range of pedagogical tools, a documentation centre, a database, internet sites and catalogues. It prioritises persons who regularly offer activities and tools to raise awareness of the interdependence between economic growth, social progress and the environment. Thanks to the support of the Walloon Region since 2000, a magazine Symbioses is also sent to all French-speaking schools in Wallonia and Brussels (http://www.reseau-idee.be/).

In the Brussels Region, the non-profit association *Green Belgium* (in the meantime renamed *Good Planet*) has been given the task of developing and promoting an information structure for education about nature and the environment for the Dutch-speaking primary and secondary school networks.

Since the winter of 2008, Green vzw/Good Planet has also organised the Warm Pullover action under a campaign entitled '*Jongeren keren het klimaat*' (the young turn the climate), which invites primary and secondary schools of Brussels and Wallonia to focus on the climate for the entire year. This campaign receives the support of the regional Ministers for the Environment. Other highlights of the campaign are a day of environmentally friendly mobility (bicycles, car-pooling and public transport), a seasonal fruit day (reflections on the transport of food and implicit energy consumption), a water day and a recycling action day. More than 700 Belgian schools signed up to the '*Jongeren keren het klimaat*' campaign of Good Planet Belgium in 2012-2013 (http://www.jongerenkerenklimaat.be/nl/index.htm).

9.6.16. Commitment to the planet and energy ambassadors

The Brussels Capital Region makes available to teachers a complete set of pedagogical materials to raise the awareness of young people to the subject of energy, including a personal commitment document for the child to act in the interests of his/her planet, which is intended for Brussels schoolchildren in the last two years of primary education (5th and 6th year primary) and the first two years of secondary education. Specialists come to the classrooms to assist the pupils to carry out an educational, civic, and also entertaining project. The pupils become *energy ambassadors* and **put into practice simple gestures** to reduce energy consumption within the school. For the school years 2009-2011, 21 schools took part in this project.

9.6.17. Going to school by bike

The **Walloon Region** encourages the use of bicycles to travel to school. Instructor-monitors have been trained and provide advice to municipalities, schools and organisations wishing to draw up action plans.

In the **Flemish Region** too, efforts are made in this respect with the project '*duurzaam naar school*' (Sustainably to school) (http://verkeer.sg-schot.be/) and the campaign '*Sam de Verkeersslang*' (Sam the traffic snake) (http://www.verkeersslang.be/).

9.6.18. Succed with energy

One of the measures introduced in Wallonia to improve the energy efficiency of school buildings and to raise pupil awareness is the support for 'civic projects' within the primary and secondary schools interested.

In practice, a steering group must be set up within the school, bringing together various people (e.g. headmaster, workshop manager, teaching staff, pupil representatives, head of technology, etc.). The school can obtain the support of the Energy Education Facilitator (see 9.6.7) to develop its project. The Facilitator provides his/her services free of charge for the school.

Various tools are proposed and/or implemented à la carte, depending on the needs (= avoiding waste) and wishes of the school:

- performance of a technical audit
- loan of measuring instruments
- support in making posters or small awareness-raising videos
- invitation of speakers, etc.

In addition, to assist the teaching staff, a large number of associations involved in energy education offer actions adapted to all ages. They are listed on the site http://energie.wallonie.be.

9.6.19. Higher education

Post-university training in strategic carbon management

The issue of climate change is also receiving growing attention in higher education: courses are given on climate change and special research teams set up for environmental issues, climate change or glaciology.

Training organised jointly by the Universities of Louvain and Liège (UCL/ULg) on strategic carbon management was organised under the competitiveness cluster GreenWin (horizontal axis - training) in 2012. In fact, the number of green jobs in industries linked to ecology is increasing significantly; there are therefore clearly opportunities to be taken for growth and jobs. The sectoral agreements between the industrial sector (chemicals, paper, steel, glass, cement, etc.) and Wallonia show the awareness and commitment of the business world to the question of greenhouse gas emissions. There was previously no training in Belgium to prepare for this profession beforehand.

120 large Belgian enterprises are already directly affected by binding legislation (Emission Trading System), only some of which had professionals trained in this field. Small and medium-sized enterprises will also gradually come to review their activities in a society with the objective for 2020 of achieving a 'low carbon economy'. Other roles are covered by the training, such as those of carbon auditors, for example. The AwAC is a partner in this training (http://www.uclouvain.be/357267).

In the Flemish Region, the various colleges and universities have integrated into their courses a large number of aspects which are relevant in the light of climate change (science, architects, mobility experts, etc.).

Awareness-raising organised by the Universities

The ULB has organised several awareness-raising actions:

- Travelling exhibitions: '*Climat: il y a du changement dans l'air*' (Climate: there is change in the air) (2008) and '*Maîtrise du CO_2, un combat à gagner*' (Control of CO_2 a battle to be won) (2009) presented in the schools of Brussels and Wallonia (http://www.ulb.ac.be/inforsciences3/nomades/expositions/climat.html / http://www.ulb.ac.be/inforsciences3/nomades/expositions/co2.html);
- Exhibition: '*Énergies durables*' (Sustainable energies) (2012-2013) (http://www.ulb.ac.be//ccs/Energies-Durables.html);
- '*CO_2, ami ou ennemi?*' (CO_2 friend or foe?) interactive exhibition for primary and secondary schools and the general public (http://www.ulb.ac.be//ccs/xpChimie_2013.html);
- Workshops: '*La chimie du CO_2: de la respiration à l'effet de serre*' (The chemistry of CO_2 respiration to greenhouse effect) (2012) (http://www.ulb.ac.be/facs/sciences/chim/Experimentarium-2012-CO2.html), '*Sale temps pour le climat*' (Bad time for the climate) and '*Construire sa propre station météo*' (Build your own weather station (2009-2013) (http://www.ulb.ac.be//ccs/AteliersCarte_Nature.html for the latter two);
- In 2012-2013, popularisation of science even covered 'ice cores'.

The Science Spring, organised by the various universities since 2000, each year presents workshops and student projects for schools and the general public: the theme of climate is included (http://www.printempsdessciences.be/bruxelles).

The Flemish colleges and universities organise regular awareness-raising actions, including via the Flemish authorities' Eco-campus project (see 9.6.22).

9.6.20. Training for building professionals and other trades in the construction sector

Belgium is facing a major challenge to make its entire building stock energy efficient. One of the conditions for achieving these objectives is sufficient knowledge of sustainable building and living, energy efficiency, building and renovating energy-efficiently, etc. in the construction sector. Research is being carried out and consultations taking place to devote additional attention in both the existing training courses and in further training to sustainable, energy-efficient building. These subjects are therefore gradually being integrated into the basic training, further training projects are being set up, etc.

Brussels Environment is coordinating the training policy 'city and sustainable buildings' of the Brussels Capital Region. The aim of this policy is to develop the skills of the professionals in the field of sustainable city and buildings, to enable them to achieve progress in moving the Brussels building stock and the city in general towards the policy objectives of Brussels in this field. The three main priorities are:

1. Training and seminars in excellence: This involves organising training courses and seminars where shortfalls are identified. The seminars allow the public authorities to address the sector with the necessary flexibility concerning innovative techniques or topical subjects such as the forthcoming regulations. The training in excellence allows professionals to be offered training in innovative techniques which are more ambitious than those imposed by the regulations, pending such training becoming available on the operators' market, and on the other hand to achieve results, content and experience from training to be communicated to these economic operators to offer them support in the transition to training in sustainable building.
2. Regulatory training: This involves the recognition of training organised by operators for future accredited profes-

sionals, in the regulatory context. These are training courses aimed at providing professionals with the minimum compulsory skills. This includes, for example, training for professionals involved in the energy performance of buildings, such as advisers and certifiers.

3. Training outside Brussels Environment: For Brussels Environment, this involves translating the policy objectives of the Region regarding sustainable city and buildings into training objectives for the training organisers.

The Sustainable Development Unit of the Ministry of the Wallonia-Brussels Federation organised, in cooperation with the Architecture Unit of its administration responsible for infrastructure, an exhibition '*Architecture durable. Partout en Europe!*' (Sustainable Architecture throughout Europe!) from 13 to 24 February 2012.

9.6.21. The Interdisciplinary Training Centre for Instructors of the University of Liège (CIFFUL)

CIFFUL (*Centre Interdisciplinaire de Formation de Formateurs de l'Université de Liège*) is a university engineering research and development centre in training used in response to the issues and challenges of Science, Technology and Society.

Within partnerships, CIFFUL is competent mainly to act as a scientific and pedagogical interface between research and practice. Its approach is to tap the diversity of knowledge, organise interdisciplinary analysis and in this way promote the construction of new functional knowledge which satisfies two major requirements:

- on the one hand, the models and standards generated by the specialists (sectoral and university research centres, public bodies and authorities, federations, etc.);
- and, on the other hand, the knowledge and experience used by practitioners (designers, entrepreneurs, workers, instructors, teachers, etc.).

To achieve this, CIFFUL is developing an original methodology based on the participation of the operators concerned, following a logic of solving problems encountered in the field and research-action: listening to one another, questioning, exchange and collegiate build-up of knowledge.

For some twenty years, CIFFUL has been contributing to the development of training programmes under partnerships bringing together bodies from the construction sector (CCW, FFC, CSTC, CIWACO, etc.), and institutional training providers (FOREM, IFAPME, Competence Centres, etc.), with the support of the Walloon Region (DGTRE, DGRNE, DGEE, etc.) and the European Social Fund (ESF).

The main results of these programmes are:

- adaptation of the supply of vocational training to the building trades;
- the organisation of new training;
- the updating and drawing up of training benchmarks (profiles, manuals, etc.);
- the preparation of educational tools and practical guides.

Various themes are covered: thermal insulation of buildings, ventilation of homes, energy performance of buildings, prevention of environmental risks in the building trades, sustainable construction, integrated management of quality, security and environment, improvement of the management of micro-enterprises in the construction industry and adaptability of homes.

CIFFUL has gained sound experience regarding the scientific and pedagogical guidance of partnerships in the field of vocational training. Thanks to the methodology it develops, it makes a substantial contribution to the design and implementation of programmes and information media, awareness-raising and training meeting both the expectations of the developers and specialists and the needs of the professionals.

9.6.22. Eco-campus

The Flemish Region urges colleges and universities to include care of the environment in their organisation. They receive the necessary support for this in terms of methodology and content. The emphasis is placed on the measurable benefit for the environment, compliance with the environmental legislation and the educational added value.

The students are encouraged during their education to treat the environment with respect and subsequently to maintain this attitude in their professional careers. The students receive help in including care for the environment in their student life and are in this way in a position to limit the environmental impact of their own actions and activities.

9.6.23. Youth, Space, Surroundings and Environment (JeROM)

The Flemish Region encourages young people to adopt critical involvement and a sense of responsibility regarding environmentally compatible behaviour. Youth groups are supported to integrate care of the environment in their work. For this purpose, they are provided with knowledge, insight and educational instruments and are encouraged to reduce their impact on the environment.

9.6.24. Training as energy expert

The three Regions provide training in energy audit expertise. These measures are described in Annex 3.

9.6.25. The sectoral agreements

The Regions have concluded sectoral agreements with the main industrial trade unions in the context of the monitoring of the Kyoto Agreements. They focus mainly on energy efficiency.

9.6.26. International cooperation and education in the southern countries

Support is given by Wallonia-Brussels International (WBI) to the Institut de la Francophonie pour le développement Durable (IFDD) to assist in the process of constructing national sustainable development strategies in developing countries and in their participation in the multilateral regulation process in the field of the environment and sustainable development.

Five major programmes have been carried out in this context. They aim to:

1. increase the institutional capacities of developing countries/least developed countries for the preparation and implementation of national sustainable development strategies

Five countries have benefited from IEPF support in this field. Côte d'Ivoire and Togo confirmed their strategy. Gabon and Comoros started the exercise. Benin organised the peer review of its strategy. This exercise for training and boosting capacities in the field of national sustainable development strategies involved an average of 70 executives from the public sector, private sector, civil society and NGOs using tools drawn up by French-speaking expertise.

A training programme for senior executives of the public and private administrations was launched with the Ecole nationale d'Administration publique (ENAP) of Quebec and the ENA of Dakar on integration of the sustainability analysis in the investment projects. Some twenty participants from 9 countries took part. The permanency of this initiative is encouraged.

Activities for the preparation of the RIO+20 Conference were launched with the production of 2 publications on '*L'évaluation participative des cadres institutionnels pour une gouvernance optimale du développement durable dans l'espace francophone*' (Participative evaluation of the institutional frameworks for optimum governance of sustainable development in the French-speaking area) and '*Comprendre la responsabilité sociétale de l'entreprise et Agir sur les bases de la norme ISO2600*' (Understanding corporate social responsibility and acting on the basis of the ISO 2600 standard).

2. improve the dissemination of information for sustainable development

Both the paper and the digital versions of the IFDD publications, Médiaterre, LEF and Objectif Terre (OT), are expanding. For example, Médiaterre has 28 portals, about 10 000 subscribers with 28 million pages read for 2011, 3 700 dispatches posted. The animation is undertaken in partnership with institutions and NGOs working towards the same objective.

3. increase the mastery of the environmental management tools for development

This programme covers the activities for boosting capacities in environmental law, strategic assessment, environmental studies of environmental impacts and environmental economy. An average of 80 participants took part in 2012. 4 training workshops were organised in partnership with the IUCN and the Senghor University of Alexandria. A scientific colloquium on 'Forests, energy, climate change and environmental assessment: for sustainable development from global to local' was organised in partnership with the *Secrétariat International Francophone pour l'Évaluation Environnementale* (SIFÉE) in Yaoundé.

4. develop the capacities to draw up and implement energy policies

The activities developed are at 2 levels:

1. establishment of training in sustainable use of energy (energy efficiency in buildings and industry, tapping renewable energy, rural electrification and support for operators).
2. support for construction of energy policies with tools such as the energy information system or the integrated centres of excellence in energy. Information sheets and technical manuals have been drawn up to accompany the themes developed in the training.

5. boost the capacities of French-speaking developing countries to participate in the international negotiations on the environment and sustainable development

In this context, the IFDD organised 3 training workshops on:

- access to and sharing of the advantages stemming from genetic resources in Marrakesh in partnership with the GIZ and the secretariat of the Convention on Biological Diversity;
- the implementation of projects for adaptation/mitigation of the impacts of climate change with the private sector operators in Lomé in partnership with the West African Development Bank (BOAD) and ISESCO;
- negotiation techniques in Libreville, in cooperation with the Ministry of the Environment of Gabon.

Four consultations were held for the two conventions (climate and desertification), which held two conferences of the parties for experts and two for ministers in 2013.

The negotiator guides and summaries for decision-makers, as well as analyses were produced for the conferences of the parties to the Conventions on climate change of Durban and on desertification of Changwon. The guide on climate change was widely disseminated in English, at the request of English-speaking developing and least developed countries. The analysis was also translated into English and Arabic.

The IFDD also provided the technical support of its network of experts for the implementation of the 'Fast start' financing of the Wallonia-Brussels Federation in 6 countries (Benin, Burkina, Burundi, DRC, Rwanda, Senegal).

Other information on boosting capacity in various countries of the South by financing some ten projects by the Walloon Air and Climate Agency under Fast start financing are listed in chapter 7.

9.6.27. Financing of Regional workshop on Article 6 of the Climate Change Convention

The Walloon Air and Climate Agency participated in the financing of a UNFCCC workshop on the application of Article 6 of the Convention for African countries in Gambia in 2010.

9.7. Sources of information on the internet

Several references have been made to websites in this chapter. A list of these and other sites is given below for more information on the environment, climate change, energy and mobility (non-exhaustive list).

9.7.1. Environment, sustainable development and climate change

http://www.lne.be

This link sends you to the website of the Environment, Nature and Energy Department (LNE) of the Flemish Government. This official site presents the policy of the Flemish environmental administration with regard to climate and other issues.

http://www.klimaattips.be

This website focuses on suggestions for a wide range of themes on what each Flemish citizen can do to contribute towards a healthier climate. References are made here for each (sub)theme to relevant sites and brochures (which can be consulted on the internet) with more detailed information. In addition, the actions of the Flemish authorities themselves are also described and a section is being developed with explanations on climate change and what this means for the Flemish.

http://www.vmm.be

The VMM (Flemish Environment Agency) is one of the public administrations charged with the task of designing and adapting environmental policy in the Flemish Region. It also reports on the quality of the environment in general and that of air and water in particular.

http://www.milieurapport.be

The Environmental Reporting Service (MIRA) of the VMM has a three-fold task:

- to provide a description, analysis and evaluation of the existing state of the environment;
- to provide an evaluation of the environmental policy carried out so far;
- to provide a description of the anticipated trend in the environment if the policy remains unchanged and if the policy is changed according to a number of scenarios considered relevant.

MIRA achieves this through regular publication of indicator reports, research reports, news items, etc., and especially too via its website. MIRA hereby ensures a scientific basis for environmental policy planning in Flanders, but also strives to make the available information more widely known.

http://www.leefmilieubrussel.be

Brussels Environment – IBGE/BIM is the administration for the environment and energy of the Brussels Capital Region. This institution has the tasks of studying, overseeing and managing air, water, soil, waste, energy, noise and nature (green areas and biodiversity). It also issues environmental permits, checks that they are respected and develops and supports projects involving education about the environment in Brussels schools, participates in meetings and in negotiations at the Belgian and international levels, etc. In short, Brussels Environment develops activities in the domain of eco-construction and the links between health and the environment. Its website provides information on all the environmental topics. An info telephone line is also available.

http://airclimat.wallonie.be

This site presents the transversal Air/Climate Plan of the Walloon Government as well as general documentation on air quality, its contaminants, the actions taken by the Region, the steps to take at the individual level, the results of air analyses under way, legislation, etc. It is completed by a quiz on energy.

http://environnement.wallonie.be

The portal of the Walloon Region for environmental questions is managed by the Directorate-General for Agriculture, Natural Resources and the Environment (*DGARNE*). The 'Analytical Report on the State of the Walloon Environment' and the 'Walloon Environment Scoreboard' published each year include a specific chapter relating to climate change.

http://www.irceline.be

The Belgian Interregional Environment Agency (*IRCEL-CELINE*) provides information about the quality of ambient air in the country's regions. Its website offers a daily ozone bulletin based on information gathered in various measuring stations, as well as on data archives (dating from 1998). Every half-hour the air quality (O_3, NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$) is measured and data are published on the site.

http://www.climat.be / www.klimaat.be

This is the site of the Climate Change Section of the Federal Public Service of Health, Food Chain Safety and Environment (DG Environment). It provides citizens with information on the causes and consequences of climate change, the international, European and Belgian climate policy, the situation in Belgium, and an overview of recent data on greenhouse gas emissions. All the official reports, decisions of the Federal Government and concrete actions which affect citizens are set out there.

http://www.educapoles.org

EducaPoles is the educational site of the International Polar Foundation (IPF). It aims at raising awareness among young people and the educational world of the importance of the Polar Regions and to climate change by offering adapted educational tools and projects. Three other websites also present IPF activities: the website of IPF, SciencePoles and ExploraPoles.

http://www.sustainablecity.be

A new website, intended to showcase everything undertaken for sustainable development in Brussels, was developed and placed online in 2011 in three languages (French, Dutch and English). It comprises seven thematic headings: sustainable building, sustainable neighbourhoods, green city, sustainable consumption, sustainable economy, mobility, reducing pollution.

http://www.reseauquartiersdurables.be

A participative internet platform facilitating exchanges of experience and contacts between the sustainable neighbourhoods of the Brussels Capital Region.

9.7.2. Energy

http://www.economie.fgov.be

The website of the Federal Public Service Economy, SMEs, Self-employed and Energy provides information about its areas of competence related to energy, including renewable energy (technologies, actors, financial regulations, legislation, statistics, links, etc.).

http://www.energivores.be / www.energievreters.be

By means of a calculator module, this energy guzzlers' site of the federal authorities allows you to estimate the energy consumption and the CO_2 emissions associated with various energy- consuming or saving devices in the household (household appliances, TV, car, lighting, windows, roof insulation, wall insulation). It helps you to make a selection of the most economical models and materials available on the Belgian market before purchasing a new appliance or insulation material. The site regularly adds new categories of products. For more details: see 9.4.4.

http://www.topten.be

This website allows the most energy-efficient products to be found quickly and easily for the home and at the office. It offers an overview for a whole series of products (domestic appliances, lighting, cars, circulation pumps, printers, PC and TV screens) of the most economical models on the Belgian market. It also provides an overview of the suppliers of green electricity. The website is an initiative run by the Bond Beter Leefmilieu Vlaanderen vzw with the cooperation of the Brussels Capital Region, the non-profit association Ecoconso and the European Commission.

http://www.energiesparen.be

The Flemish Energy Agency (VEA) of the Flemish Government has a website which provides a lot of information about all matters linked to energy: Flemish policy on energy, rational energy use, statistics, the possibilities to receive subsidies, environmentally-friendly energy production, etc. Under different headings, it offers information for specific target groups (households, public bodies, enterprises, architects, schools and environmental associations). Brochures on rational energy use (insulation, ventilation, heating, low-energy construction, practical advice, etc.) and sustainable energy (biomass, combined heat and power, solar energy, heat pumps, etc.) can be downloaded.

http://energie.wallonie.be/

In the Walloon Region, the website of the Walloon administration in charge of energy provides extensive information about energy. In addition, sixteen energy offices spread out over the Walloon territory provide practical information for private persons who wish to use energy efficiently and rationally. Their services are independent and free of charge. The topics dealt with range from heating to production of hot water as well as the exterior insulation of buildings, needs with respect to ventilation, rational use of electrical household appliances and sources of renewable energy, bioclimatic renovation, etc. A broad panoply of tools is made available to the public: brochures, specialised manuals, etc.

http://www.stadswinkel.be

In the Brussels Capital Region, the Urban Centre manages an information desk which provides advice to the general public on possibilities for saving energy and recourse to renewable energy. It also offers residential energy audits free of charge.

http://www.energie-uitdaging.be

The programme of the Brussels Capital Region aiming to encourage behaviour involving rational use of energy.

http://www.brugel.be

BRUGEL (standing for BRUxelles Gaz Electricité/ Brussels Gas and Electricity) is the regulator of the energy market in the Brussels Capital Region. Its tasks include advising the public authorities on the organisation and operation of the regional energy market, verification of application of legislation and providing general information to the public.

http://www.emis.vito.be

EMIS, the *Information System on Energy and the Environment*, is a project of the Flemish Region. This system collects and processes a wide range of information relating to energy and the environment which it divides into 4 major categories: energy numbers, guide to enterprises, environmental technology and legislation.

http://www.ode.be

The *Organisation for Sustainable Energy* (ODE) is the central vector of information on renewable energy in Flanders to both households and to enterprises. It has a permanent secretariat open to the public and manages activities such as the publication of high quality brochures or monitoring the share of renewable energy in overall energy consumption in Flanders.

http://www.wtcb.be

This national website of the Scientific and Technical Centre for the Construction Industry provides information on legislation, regulations, subsidies and the procedures to follow in the matter of thermal insulation and ventilation of buildings.

9.7.3. Mobility

http://www.mobilit.fgov.be

The site of the Federal Public Service Mobility and Transport explains how the issue of mobility fits into the federal policy on sustainable development. It also allows the level of CO_2 emissions of various models of vehicles to be checked.

http://statbel.fgov.be

The portal of the *National Institute of Statistics* is there for all studies, numbers and statistics linked to traffic and mobility. See in particular the sections on ‘mobility and the environment’ and ‘climate and the greenhouse effect’.

http://www.mobielvlaanderen.be

This Flemish Region site informs the population about various aspects of the mobility issue: a lot of information about the possibilities of public transport, freight traffic, travel between home and workplace, the policy of mobility at the various levels of government, statistics, etc.

http://mobilite.wallonie.be

Site used by the Walloon Region to publicise its policy on mobility and to inform the public about all mobility-related topics. Links are provided to the *Network of advisers on mobility*, the campaign *Mobility Week*, the *Centre for dissemination of documentation on mobility*, alternative means of transport (bicycling organisations, car-sharing group, etc.) and *Data Sheets on Multimodal Accessibility*.

http://www.mobielbrussel.irisnet.be/

Brussels Mobility (AED - Administration for Equipment and Travel of the Brussels Capital Region) takes care of equipment on the road network and public transport infrastructure in the Brussels Region. Its objectives include improving mobility, promoting public transport, integrating all users into the travel policy, assisting the taxis and seeing to maintenance of equipment.

http://www.bikeexperience.be

The Bike Experience campaign (replacing the Friday Bike Day campaign) raises awareness and encourages the staff of Brussels businesses to come to work by bike, by borrowing bikes and the possibility for those who are not yet used to cycling in town, to receive assistance from a coach who accompanies them and gives them good advice for a few days.

http://www.ecoscore.be

The method of Ecoscore allows you to measure the environmental score of vehicles of all brands. It gives an indication of the overall environmental performance of your vehicle or of the one you want to buy.

http://www.brussels.irisnet.be/mobility-and-transport

The website of the Brussels Capital Region offers a special section devoted to mobility and informs citizens about the various travel modes within the Region.

http://www.mobimix.be

Mobimix.be is a digital platform for fleet managers, buyers, mobility experts and other professionals who work in mobility and transport. The website offers information about eco-driving, sustainable fleet management, taxation, mobility budget and smart mobility management. It uses information sessions and a free monthly newsletter to keep interested parties informed about changes in legislation, instruments for fleet managers and best practices for companies and governments. Mobimix.be is an initiative by the Flemish Government, the Flemish Institute for Technological Research (VITO), the Flemish Foundation for Traffic Knowledge (VSV), Mobiel 21 and the Society for a Better Environment (Bond Beter Leefmilieu).

http://www.uwe.be/mobilite

This website is managed by the Mobility Unit of the UWE, the Walloon Union of Enterprises. This unit acts as adviser to enterprises and helps them with regard to sustainable mobility of people and goods. The site provides information about *company mobility plans* (integrated systems to optimise all movements), the various means of transport (on foot, bicycling, car sharing, public transport), the role of 'mobility' coordinators within enterprises, tele-working, etc.

Annexes

Annex 1. Supplementary information under Article 7 (2) of the Kyoto Protocol – Correlation table

Information reported under Article 7 (2)	Chapter of the 6th National Communication
National systems pursuant to Article 5 (1)	3.3
National register	3.4
Complementarity in relation to the mechanisms pursuant to Articles 6, 12 and 17	5.3
Policies and measures pursuant to Article 2	4.3.2
National and regional programmes and/or legislative provisions and implementing and administrative procedures	4.2
Information under Article 10	
Article 10a	3.3
Article 10b	6.4
Article 10c	7.4
Article 10d	8
Article 10e	9.6
Financial resources	7.2

Annex 2. Summary tables of emission trends

The following tables come from national inventories. They are available only in English.

- For carbon dioxide (CO_2), see pages 226 to 229.
- For methane (CH_4), see pages 230 to 233.
- For nitrous oxide (N_2O), see pages 234 to 237.
- For fluorinated gases (HFC, PFC and SF_6), see pages 238 to 239.
- For the overall summary, see pages 240 to 243.

Table 1 - Trend in emissions – CO_2

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	**110 386.73**	**113 252.50**	**111 872.55**	**110 893.06**	**114 184.49**	**114 693.18**	**119 425.33**	**113 448.82**	**119 611.34**	**113 814.31**
A. Fuel Combustion (Sectoral Approach)	110 302.28	113 169.36	111 789.18	110 809.43	114 100.60	114 609.06	119 332.88	113 355.61	119 511.36	113 704.40
1. Energy Industries	29 789.13	29 709.61	28 550.42	28 023.76	29 802.19	29 222.91	29 026.05	27 889.67	30 609.38	26 919.49
2. Manufacturing Industries and Construction	32 604.84	32 519.63	31 721.33	30 624.37	32 044.76	32 492.30	31 808.21	30 998.75	33 448.50	31 995.19
3. Transport	20 426.97	20 599.33	21 327.06	21 817.10	22 284.67	22 362.71	22 786.97	22 988.72	23 655.42	24 001.53
4. Other Sectors	27 320.06	30 179.43	30 029.19	30 184.42	29 808.83	30 427.51	35 623.84	31 382.36	31 705.15	30 695.29
5. Other	161.28	161.36	161.19	159.78	160.16	103.61	87.83	96.12	92.91	92.90
B. Fugitive Emissions from Fuels	84.45	83.14	83.37	83.63	83.89	84.13	92.44	93.20	99.97	109.91
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	84.45	83.14	83.37	83.63	83.89	84.13	92.44	93.20	99.97	109.91
2. Industrial Processes	**8 417.38**	**8 006.94**	**7 845.06**	**7 826.61**	**9 124.74**	**9 581.64**	**8 873.79**	**9 207.57**	**9 315.40**	**9 562.23**
A. Mineral Products	5 750.33	5 381.69	5 585.75	5 565.32	5 898.60	6 192.36	5 669.69	5 880.46	5 966.78	6 052.44
B. Chemical Industry	644.67	615.84	433.02	482.62	1 273.18	1 414.04	1 476.43	1 518.60	1 458.13	1 668.45
C. Metal Production	2 022.38	2 009.41	1 826.30	1 778.67	1 952.96	1 975.25	1 727.67	1 808.51	1 890.49	1 841.34
D. Other Production	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
4. Agriculture										
A. Enteric Fermentation										
B. Manure Management										
C. Rice Cultivation										
D. Agricultural Soils										
E. Prescribed Burning of Savannas										

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
115 415.59	**115 934.52**	**114 658.88**	**117 892.65**	**118 295.46**	**114 884.51**	**111 078.31**	**106 736.02**	**110 034.47**	**100 569.15**	**106 711.16**	**96 361.31**	**-12.71**
115 250.39	115 786.99	114 506.02	117 781.39	118 193.20	114 780.27	110 947.76	106 621.23	109 917.90	100 451.93	106 608.07	96 268.18	-12.72
28 300.61	26 783.03	28 283.29	29 388.63	29 552.21	29 281.16	27 788.65	27 276.38	25 316.06	25 713.21	26 246.38	21 860.53	-26.62
33 148.48	32 329.66	31 059.05	30 473.33	30 487.15	28 689.25	28 828.05	27 594.98	28 137.76	19 797.61	23 389.21	23 346.37	-28.40
24 453.25	25 071.77	25 389.59	25 950.18	26 954.33	26 040.81	25 483.49	25 369.44	27 667.31	26 934.13	26 856.90	26 772.64	31.07
29 255.50	31 507.86	29 680.55	31 877.63	31 107.89	30 676.93	28 755.43	26 312.76	28 735.87	27 951.37	30 068.13	24 239.03	-11.28
92.55	94.68	93.54	91.61	91.63	92.12	92.13	67.67	60.92	55.61	47.45	49.60	-69.25
165.20	147.53	152.86	111.26	102.26	104.25	130.55	114.79	116.56	117.22	103.09	93.14	10.28
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
165.20	147.53	152.86	111.26	102.26	104.25	130.55	114.79	116.56	117.22	103.09	93.14	10.28
9 662.47	**9 099.99**	**9 887.97**	**9 804.95**	**10 061.66**	**10 144.47**	**10 111.05**	**9 964.76**	**9 799.09**	**7 086.24**	**7 471.19**	**7 579.98**	**-9.95**
6 143.50	5 800.90	6 320.59	5 829.10	5 802.95	5 765.20	6 045.58	5 898.67	5 961.23	4 690.98	4 804.55	5 095.96	-11.38
1 640.41	1 644.61	1 761.26	2 221.76	2 471.49	2 678.05	2 274.09	2 416.48	2 181.66	1 536.41	1 767.95	1 944.22	201.58
1 878.56	1 654.48	1 806.13	1 754.09	1 787.22	1 701.23	1 791.38	1 649.61	1 656.20	858.86	898.69	539.79	-73.31
IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
NA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**0.00**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
F. Field Burning of Agricultural Residues										
G. Other										
5. Land Use. Land-Use Change and Forestry[(2)]	**-927.38**	**-653.91**	**-950.63**	**-880.30**	**-906.06**	**-746.59**	**-546.60**	**-814.39**	**-712.31**	**-748.18**
A. Forest Land	-3 138.08	-2 883.89	-3 199.89	-3 150.87	-3 194.55	-3 053.72	-2 874.42	-3 160.44	-3 077.57	-3 132.55
B. Cropland	1 169.15	1 199.97	1 230.79	1 261.62	1 292.44	1 323.27	1 354.09	1 384.92	1 415.75	1 446.58
C. Grassland	744.74	705.92	667.11	630.32	590.13	550.67	513.25	473.36	434.45	395.44
D. Wetlands	20.55	19.65	18.76	17.87	16.97	16.08	15.19	14.30	13.41	12.51
E. Settlements	248.03	274.03	300.04	326.05	352.07	378.08	404.10	430.12	456.14	482.16
F. Other Land	28.23	30.39	32.55	34.71	36.87	39.04	41.20	43.36	45.52	47.68
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Waste	**290.25**	**292.80**	**297.70**	**298.39**	**190.40**	**146.88**	**153.25**	**165.09**	**138.83**	**168.80**
A. Solid Waste Disposal on Land	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
B. Waste-water Handling										
C. Waste Incineration	290.25	292.80	297.70	298.39	190.40	146.88	153.25	165.09	138.83	168.80
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other (*as specified in Summary 1.A*)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Total CO_2 emissions including net CO_2 from LULUCF	**118 166.98**	**120 898.33**	**119 064.68**	**118 137.76**	**122 593.57**	**123 675.11**	**127 905.77**	**122 007.09**	**128 353.26**	**122 797.16**
Total CO_2 emissions excluding net CO_2 from LULUCF	**119 094.37**	**121 552.24**	**120 015.31**	**119 018.06**	**123 499.63**	**124 421.70**	**128 452.37**	**122 821.47**	**129 065.56**	**123 545.34**
Memo Items:										
International Bunkers	**16 397.83**	**16 058.65**	**15 840.60**	**16 347.83**	**16 730.40**	**15 837.61**	**19 226.65**	**21 205.85**	**22 461.54**	**19 421.40**
Aviation	3 094.75	2 599.52	2 584.02	2 558.01	2 518.47	2 882.88	3 336.55	3 596.43	4 059.67	4 576.18
Marine	13 303.08	13 459.13	13 256.58	13 789.83	14 211.93	12 954.73	15 890.10	17 609.41	18 401.87	14 845.22
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass	**1 997.68**	**2 016.29**	**2 171.90**	**1 781.32**	**2 062.74**	**2 283.61**	**2 366.32**	**2 439.72**	**2 496.10**	**2 605.68**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
-729.71	**-908.93**	**-1 399.77**	**-1 454.03**	**-1 341.55**	**-1 360.00**	**-1 325.10**	**-1 308.88**	**-1 306.47**	**-1 408.87**	**-1 451.42**	**-1 438.52**	**55.12**
-3 133.41	-3 331.95	-3 842.90	-3 917.35	-3 824.94	-3 863.53	-3 848.78	-3 824.22	-3 776.43	-3 829.86	-3 841.38	-3 823.26	21.83
1 477.40	1 508.23	1 539.18	1 570.13	1 601.08	1 632.03	1 662.98	1 704.57	1 785.82	1 800.40	1 814.97	1 831.13	56.62
356.64	317.83	279.29	240.82	202.22	163.69	125.16	111.68	-13.20	-63.25	-101.83	-116.11	-115.59
11.62	10.73	9.91	9.09	8.26	7.44	6.62	-14.60	-20.69	-21.27	-21.85	-22.43	-209.13
508.18	534.21	560.51	586.81	613.12	639.43	665.74	638.35	611.73	598.66	592.07	585.43	136.04
49.85	52.01	54.24	56.47	58.71	60.94	63.17	75.34	106.30	106.45	106.60	106.70	277.92
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
171.60	**187.20**	**424.45**	**463.27**	**506.98**	**581.51**	**610.47**	**735.36**	**699.08**	**598.28**	**690.79**	**525.28**	**80.97**
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
171.60	187.20	424.45	463.27	506.98	581.51	610.47	735.36	699.08	598.28	690.79	525.28	80.97
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**
124 519.95	**124 312.77**	**123 571.53**	**126 706.84**	**127 522.55**	**124 250.50**	**120 474.73**	**116 127.26**	**119 226.16**	**106 844.79**	**113 421.73**	**103 028.05**	**-12.81**
125 249.66	**125 221.70**	**124 971.31**	**128 160.87**	**128 864.10**	**125 610.50**	**121 799.83**	**117 436.13**	**120 532.64**	**108 253.66**	**114 873.15**	**104 466.57**	**-12.28**
20 697.04	**20 402.46**	**26 138.57**	**26 782.49**	**27 960.41**	**28 487.53**	**30 961.51**	**34 399.21**	**35 252.91**	**26 596.15**	**25 076.21**	**29 539.49**	**80.14**
4 645.52	4 201.88	3 497.45	3 812.23	3 713.58	3 531.20	3 676.87	3 971.90	4 282.75	3 900.34	4 118.64	4 251.31	37.37
16 051.52	16 200.58	22 641.12	22 970.26	24 246.82	24 956.33	27 284.64	30 427.32	30 970.15	22 695.81	20 957.57	25 288.18	90.09
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**
2 660.04	**2 891.92**	**3 010.52**	**3 562.80**	**4 106.76**	**4 472.88**	**5 264.62**	**6 073.83**	**7 174.70**	**8 295.80**	**9 683.03**	**9 745.59**	**387.84**

Table 2 - Trend in emissions – CH_4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	**63.56**	**58.62**	**51.67**	**52.79**	**45.93**	**46.25**	**46.40**	**42.75**	**41.39**	**40.35**
A. Fuel Combustion (Sectoral Approach)	22.70	23.68	23.31	22.59	20.37	20.35	21.31	19.02	18.59	17.54
1. Energy Industries	0.83	0.82	0.77	0.76	0.78	0.77	0.67	0.62	0.66	0.56
2. Manufacturing Industries and Construction	3.94	3.69	3.35	3.04	3.10	3.16	2.96	2.99	3.25	3.17
3. Transport	6.07	6.13	6.48	6.28	6.04	5.97	5.72	5.06	4.82	4.40
4. Other Sectors	11.85	13.04	12.70	12.50	10.45	10.44	11.95	10.35	9.86	9.40
5. Other	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
B. Fugitive Emissions from Fuels	40.86	34.94	28.36	30.19	25.56	25.90	25.09	23.73	22.79	22.81
1. Solid Fuels	15.70	9.98	4.10	0.89	0.83	0.83	0.83	0.75	0.65	0.62
2. Oil and Natural Gas	25.16	24.96	24.26	29.30	24.73	25.06	24.25	22.98	22.14	22.18
2. Industrial Processes	**0.00**	**0.01**	**0.01**	**0.12**	**0.15**	**0.13**	**0.19**	**0.19**	**0.27**	**0.26**
A. Mineral Products	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
B. Chemical Industry	0.00	0.01	0.01	0.12	0.15	0.13	0.19	0.19	0.27	0.26
C. Metal Production	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
D. Other Production										
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use										
4. Agriculture	**264.14**	**260.74**	**260.10**	**263.80**	**263.37**	**267.25**	**263.76**	**261.95**	**261.92**	**263.19**
A. Enteric Fermentation	196.08	194.86	192.87	194.36	194.22	196.30	192.65	190.39	188.64	189.01
B. Manure Management	68.06	65.89	67.24	69.44	69.16	70.95	71.10	71.56	73.29	74.17
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
38.33	**38.43**	**35.52**	**34.92**	**34.60**	**34.55**	**34.74**	**34.67**	**34.41**	**33.05**	**36.57**	**32.28**	**-49.21**
16.12	16.53	14.75	15.06	15.00	14.24	14.58	14.59	15.46	14.06	15.35	12.87	-43.31
0.66	0.65	0.64	0.64	0.65	0.66	0.97	1.66	1.66	1.68	1.96	1.82	117.86
3.61	3.64	3.49	3.64	3.73	3.27	3.61	3.25	3.82	2.53	3.21	2.85	-27.51
3.16	2.89	2.57	2.37	2.12	1.82	1.50	1.29	1.14	0.94	0.93	0.90	-85.27
8.69	9.35	8.04	8.39	8.50	8.49	8.49	8.38	8.84	8.91	9.26	7.29	-38.43
0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	65.80
22.20	21.90	20.77	19.86	19.60	20.31	20.16	20.08	18.95	19.00	21.22	19.41	-52.49
0.63	0.64	0.54	0.53	0.57	0.56	0.57	0.50	0.30	0.19	0.29	0.28	-98.23
21.57	21.26	20.23	19.33	19.03	19.75	19.60	19.58	18.66	18.80	20.92	19.14	-23.95
0.20	**0.27**	**0.35**	**0.41**	**0.94**	**2.52**	**2.97**	**3.30**	**2.57**	**1.03**	**0.94**	**0.56**	**92 432.88**
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
0.20	0.25	0.35	0.41	0.52	0.56	0.27	0.55	0.28	0.18	0.33	0.09	13 903.37
IE,NA,NO	0.02	IE,NA,NO	IE,NA,NO	0.42	1.96	2.70	2.75	2.29	0.84	0.60	0.48	100.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
254.09	**251.96**	**244.16**	**236.42**	**233.58**	**230.37**	**228.54**	**233.94**	**232.40**	**233.11**	**235.27**	**231.82**	**-12.24**
183.16	183.42	177.31	171.38	169.90	167.33	165.72	169.54	167.83	167.99	168.73	165.85	-15.41
70.93	68.54	66.85	65.04	63.68	63.04	62.83	64.40	64.57	65.12	66.54	65.96	-3.08
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use. Land-Use Change and Forestry[2]	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.00**	**1.09**	**0.01**	**0.02**	**0.00**
A. Forest Land	0.02	0.02	0.02	0.01	0.02	0.00	1.08	0.01	0.02	0.00
B. Cropland	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
C. Grassland	NE,NO	NE,NO	NE,NO	0.01	0.00	NE,NO	0.01	0.00	0.00	0.00
D. Wetlands	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Waste	**134.59**	**134.12**	**134.87**	**124.76**	**130.64**	**127.97**	**119.84**	**118.86**	**113.39**	**106.84**
A. Solid Waste Disposal on Land	124.47	123.94	124.61	114.49	120.36	117.78	109.76	108.97	103.85	98.74
B. Waste-water Handling	10.02	10.07	10.13	10.13	10.11	9.91	9.71	9.37	8.98	7.46
C. Waste Incineration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D. Other	0.10	0.10	0.13	0.14	0.16	0.27	0.37	0.52	0.56	0.63
7. Other (*as specified in Summary 1.A*)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Total CO_2 emissions including net CO_2 from LULUCF	**462.31**	**453.52**	**446.67**	**441.48**	**440.11**	**441.60**	**431.28**	**423.76**	**416.99**	**410.63**
Total CO_2 emissions excluding net CO_2 from LULUCF	**462.28**	**453.49**	**446.65**	**441.46**	**440.09**	**441.60**	**430.19**	**423.75**	**416.97**	**410.62**
Memo Items:										
International Bunkers	**0.11**	**0.11**	**0.11**	**0.10**	**0.11**	**0.11**	**0.12**	**0.12**	**0.12**	**0.13**
Aviation	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08
Marine	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass										

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
0.00	**0.00**	**0.01**	**0.01**	**NE,NO**	**0.00**	**0.00**	**0.00**	**NE,NO**	**NE,NO**	**NE,NO**	**0.30**	**1.204.88**
0.00	0.00	0.01	0.01	NE,NO	0.00	0.00	0.00	NE,NO	NE,NO	NE,NO	0.13	466.67
NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.00
0.00	NE,NO	NE,NO	0.00	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.17	100.00
NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
102.14	**88.09**	**79.00**	**65.22**	**64.12**	**56.17**	**53.04**	**46.57**	**41.71**	**39.84**	**37.13**	**37.51**	**-72.13**
94.42	81.27	72.55	59.09	58.18	50.39	47.01	40.78	36.23	34.17	31.24	31.45	-74.73
7.03	6.16	5.75	5.49	5.24	5.11	5.11	4.81	4.57	4.65	4.74	4.84	-51.73
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
0.70	0.66	0.69	0.64	0.70	0.67	0.93	0.98	0.90	1.02	1.15	1.22	1.076.78
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**
394.76	**378.76**	**359.04**	**336.97**	**333.24**	**323.61**	**319.30**	**318.47**	**311.09**	**307.03**	**309.91**	**302.47**	**-34.57**
394.76	**378.76**	**359.03**	**336.97**	**333.24**	**323.61**	**319.30**	**318.46**	**311.09**	**307.03**	**309.91**	**302.17**	**-34.64**
0.13	**0.12**	**0.11**	**0.11**	**0.11**	**0.11**	**0.10**	**0.11**	**0.11**	**0.09**	**0.09**	**0.09**	**-15.19**
0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	12.82
0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.03	-44.54
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**

Table 3 - Trend in emissions – N_2O

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	**2.11**	**2.23**	**2.28**	**2.36**	**2.48**	**2.57**	**2.75**	**2.74**	**2.87**	**2.87**
A. Fuel Combustion (Sectoral Approach)	2.11	2.23	2.28	2.36	2.48	2.57	2.75	2.74	2.87	2.87
1. Energy Industries	0.59	0.65	0.65	0.63	0.64	0.59	0.66	0.67	0.70	0.64
2. Manufacturing Industries and Construction	0.34	0.33	0.33	0.31	0.30	0.32	0.29	0.30	0.31	0.33
3. Transport	0.84	0.89	0.95	1.06	1.19	1.31	1.41	1.42	1.51	1.55
4. Other Sectors	0.33	0.35	0.35	0.35	0.34	0.35	0.39	0.35	0.35	0.35
5. Other	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
B. Fugitive Emissions from Fuels	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
2. Industrial Processes	**12.72**	**12.39**	**11.35**	**12.15**	**13.83**	**14.99**	**16.45**	**15.44**	**15.65**	**15.17**
A. Mineral Products	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
B. Chemical Industry	12.72	12.39	11.35	12.15	13.83	14.99	16.45	15.44	15.65	15.17
C. Metal Production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Other Production										
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**0.69**	**0.68**	**0.68**	**0.67**	**0.66**	**0.65**	**0.64**	**0.64**	**0.64**	**0.63**
4. Agriculture	**18.61**	**18.41**	**18.20**	**18.27**	**18.31**	**18.64**	**18.15**	**18.13**	**18.21**	**18.33**
A. Enteric Fermentation										
B. Manure Management	3.10	3.09	3.06	3.13	3.15	3.20	3.19	3.18	3.15	3.17
C. Rice Cultivation										
D. Agricultural Soils	15.51	15.31	15.13	15.14	15.16	15.44	14.96	14.95	15.06	15.16
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
2.49	**2.48**	**2.42**	**2.49**	**2.47**	**2.02**	**1.95**	**2.06**	**2.13**	**2.17**	**2.18**	**2.13**	**0.77**
2.49	2.48	2.42	2.49	2.47	2.02	1.95	2.06	2.13	2.17	2.18	2.13	0.77
0.69	0.67	0.66	0.71	0.68	0.43	0.40	0.40	0.38	0.52	0.48	0.49	-18.01
0.34	0.34	0.34	0.34	0.35	0.36	0.38	0.51	0.49	0.42	0.55	0.51	50.83
1.13	1.12	1.09	1.09	1.08	0.89	0.83	0.83	0.92	0.89	0.81	0.82	-1.94
0.33	0.35	0.33	0.35	0.35	0.35	0.33	0.32	0.34	0.33	0.34	0.30	-8.92
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-64.71
IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	0.00
14.76	**14.21**	**12.86**	**10.38**	**10.99**	**11.03**	**8.31**	**6.19**	**6.20**	**6.54**	**8.37**	**4.52**	**-64.50**
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
14.76	14.21	12.86	10.38	10.99	11.03	8.31	6.19	6.20	6.54	8.37	4.52	-64.50
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
0.69	**0.69**	**0.69**	**0.69**	**0.69**	**0.69**	**0.68**	**0.68**	**0.68**	**0.68**	**0.68**	**0.68**	**-1.07**
16.75	**16.51**	**16.32**	**15.31**	**15.35**	**14.88**	**14.60**	**14.47**	**14.12**	**14.40**	**14.47**	**14.51**	**-22.05**
2.88	2.86	2.76	2.62	2.62	2.57	2.51	2.49	2.49	2.50	2.53	2.48	-19.93
13.88	13.65	13.56	12.69	12.73	12.31	12.09	11.97	11.64	11.90	11.94	12.02	-22.47
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use. Land-Use Change and Forestry(2)	**0.04**	**0.06**	**0.07**	**0.08**	**0.09**	**0.09**	**0.85**	**0.13**	**0.14**	**0.14**
A. Forest Land	0.02	0.02	0.01	0.01	0.01	0.00	0.74	0.01	0.01	0.00
B. Cropland	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.12	0.13	0.14
C. Grassland	NE,NO	NE,NO	NE,NO	0.01	0.00	NE,NO	0.00	0.00	0.00	0.00
D. Wetlands	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Waste	**0.96**	**0.97**	**0.99**	**1.00**	**0.97**	**0.96**	**0.96**	**0.96**	**0.97**	**0.99**
A. Solid Waste Disposal on Land										
B. Waste-water Handling	0.95	0.96	0.98	0.99	0.96	0.96	0.95	0.95	0.97	0.99
C. Waste Incineration	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other (*as specified in Summary 1.A*)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Total CO_2 emissions including net CO_2 from LULUCF	**35.13**	**34.73**	**33.56**	**34.52**	**36.34**	**37.90**	**39.80**	**38.04**	**38.48**	**38.15**
Total CO_2 emissions excluding net CO_2 from LULUCF	**35.09**	**34.68**	**33.49**	**34.44**	**36.25**	**37.81**	**38.94**	**37.92**	**38.34**	**38.00**
Memo Items:										
International Bunkers	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**
Aviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Marine	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass										

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
0.15	**0.17**	**0.19**	**0.20**	**0.20**	**0.21**	**0.23**	**0.25**	**0.26**	**0.28**	**0.30**	**0.53**	**1.142.02**
0.00	0.00	0.01	0.00	NE,NO	0.00	0.00	0.00	NE,NO	NE,NO	NE,NO	0.09	466.67
0.15	0.17	0.18	0.19	0.20	0.21	0.23	0.24	0.26	0.28	0.30	0.32	1.105.24
0.00	NE,NO	NE,NO	0.00	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.12	100.00
NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
0.91	**0.96**	**0.94**	**0.93**	**0.94**	**0.94**	**0.94**	**0.94**	**0.95**	**0.95**	**0.96**	**0.97**	**1.35**
0.90	0.95	0.93	0.93	0.94	0.93	0.94	0.94	0.95	0.95	0.96	0.97	2.28
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-97.83
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**
35.76	**35.01**	**33.41**	**30.00**	**30.63**	**29.76**	**26.70**	**24.59**	**24.35**	**25.03**	**26.98**	**23.33**	**-33.59**
35.60	**34.85**	**33.23**	**29.80**	**30.42**	**29.55**	**26.47**	**24.34**	**24.08**	**24.75**	**26.67**	**22.80**	**-35.02**
0.04	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.07**	**0.08**	**130.66**
0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.04	0.04	0.05	0.05	612.55
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	-8.61
NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0.00**

Table 4 - Trend in emissions – HFC, PFC and SF_6

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Emissions of HFCs[(3)] - (Gg CO_2 equivalent)	**NA,NO**	**NA,NO**	**444.52**	**444.52**	**450.96**	**451.73**	**539.50**	**650.20**	**786.17**	**814.96**
HFC-23	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-32	NA,NO	NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	0.00	0.00	0.00
HFC-41	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-43-10mee	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-125	NA,NO	NA,NO	IE,NA,NO	IE,NA,NO	0.00	0.00	0.00	0.01	0.02	0.03
HFC-134	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-134a	NA,NO	NA,NO	0.34	0.34	0.34	0.34	0.39	0.45	0.49	0.45
HFC-152a	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.01	0.03
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-143a	NA,NO	NA,NO	IE,NA,NO	IE,NA,NO	0.00	0.00	0.00	0.01	0.02	0.03
HFC-227ea	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00
HFC-236fa	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-245ca	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Unspecified mix of listed HFCs[(4)] - (Gg CO_2 equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Emissions of PFCs[(3)] - (Gg CO_2 equivalent)	**1 753.32**	**1 677.72**	**1 829.52**	**1 758.67**	**2 113.04**	**2 335.24**	**2 217.41**	**1 211.43**	**669.33**	**347.97**
CF_4	0.05	0.05	0.05	0.05	0.06	0.07	0.07	0.02	0.00	0.00
C_2F_6	0.06	0.05	0.06	0.05	0.07	0.07	0.07	0.04	0.02	NA,NO
C_3F_8	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.01	NA,NO
C_4F_{10}	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.02	0.01	0.00
$c-C_4F_8$	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C_5F_{12}	0.04	0.04	0.05	0.04	0.06	0.06	0.06	0.02	0.03	0.02
C_6F_{14}	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02
Unspecified mix of listed PFCs[(4)] - (Gg CO_2 equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Emissions of SF6[(3)] - (Gg CO_2 equivalent)	**1 662.49**	**1 576.25**	**1 743.82**	**1 676.56**	**2 035.35**	**2 205.16**	**2 120.86**	**526.39**	**271.44**	**116.09**
SF_6	0.07	0.07	0.07	0.07	0.09	0.09	0.09	0.02	0.01	0.00

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
943.28	**1 071.31**	**1 290.07**	**1 442.09**	**1 479.48**	**1 461.82**	**1 559.19**	**1 738.90**	**1 821.60**	**1 882.52**	**1 936.25**	**1 996.06**	**100.00**
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	100.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
0.04	0.06	0.07	0.09	0.10	0.11	0.12	0.14	0.15	0.16	0.16	0.17	100.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
0.47	0.51	0.56	0.60	0.58	0.53	0.55	0.61	0.62	0.63	0.64	0.66	100.00
0.11	0.07	0.38	0.33	0.29	0.21	0.21	0.30	0.32	0.33	0.35	0.32	100.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
0.05	0.06	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.15	0.15	100.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
360.90	**222.60**	**82.22**	**208.79**	**307.36**	**154.27**	**158.80**	**180.47**	**201.87**	**115.78**	**85.44**	**178.99**	**-89.79**
0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-97.38
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-99.74
NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-98.72
0.00	NA,NO	NA,NO	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	-31.50
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
0.03	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-100.00
0.02	0.02	0.00	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.00	-87.15
NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
111.52	**129.06**	**112.03**	**99.91**	**84.34**	**85.97**	**75.03**	**81.13**	**91.19**	**97.15**	**111.15**	**116.30**	**-93.00**
0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-93.00

Table 5 - Trend in emissions – Summary

GREENHOUSE GAS EMISSIONS	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)
CO_2 emissions including net CO_2 from LULUCF	118 166.98	120 898.33	119 064.68	118 137.76	122 593.57	123 675.11	127 905.77	122 007.09	128 353.26	122 797.16
CO_2 emissions excluding net CO_2 from LULUCF	119 094.37	121 552.24	120 015.31	119 018.06	123 499.63	124 421.70	128 452.37	122 821.47	129 065.56	123 545.34
CH_4 emissions including CH_4 from LULUCF	9 708.46	9 523.84	9 380.04	9 271.11	9 242.35	9 273.62	9 056.78	8 899.00	8 756.71	8 623.19
CH_4 emissions excluding CH_4 from LULUCF	9 707.98	9 523.35	9 379.63	9 270.63	9 241.95	9 273.59	9 033.92	8 898.76	8 756.34	8 623.11
N_2O emissions including N_2O from LULUCF	10 889.86	10 767.66	10 404.04	10 701.36	11 266.13	11 749.29	12 337.22	11 792.55	11 928.90	11 825.20
N_2O emissions excluding N_2O from LULUCF	10 876.67	10 750.32	10 383.37	10 675.95	11 237.53	11 720.49	12 072.66	11 753.72	11 884.92	11 780.36
HFCs	NA.NO	NA.NO	444.52	444.52	450.96	451.73	539.50	650.20	786.17	814.96
PFCs	1 753.32	1 677.72	1 829.52	1 758.67	2 113.04	2 335.24	2 217.41	1 211.43	669.33	347.97
SF_6	1 662.49	1 576.25	1 743.82	1 676.56	2 035.35	2 205.16	2 120.86	526.39	271.44	116.09
Total (including LULUCF)	**142 181.11**	**144 443.80**	**142 866.63**	**141 989.97**	**147 701.39**	**149 690.16**	**154 177.55**	**145 086.66**	**150 765.80**	**144 524.57**
Total (excluding LULUCF)	**143 094.81**	**145 079.88**	**143 796.17**	**142 844.39**	**148 578.46**	**150 407.91**	**154 436.72**	**145 861.97**	**151 433.76**	**145 227.83**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(%)
124 519.95	124 312.77	123 571.53	126 706.84	127 522.55	124 250.50	120 474.73	116 127.26	119 226.16	106 844.79	113 421.73	103 028.05	-12.81
125 249.66	125 221.70	124 971.31	128 160.87	128 864.10	125 610.50	121 799.83	117 436.13	120 532.64	108 253.66	114 873.15	104 466.57	-12.28
8 290.04	7 953.89	7 539.80	7 076.42	6 998.05	6 795.85	6 705.37	6 687.78	6 532.86	6 447.65	6 508.21	6 351.80	-34.57
8 290.04	7 953.87	7 539.58	7 076.28	6 998.05	6 795.85	6 705.37	6 687.74	6 532.86	6 447.65	6 508.21	6 345.53	-34.64
11 084.24	10 854.15	10 357.40	9 298.60	9 494.31	9 226.85	8 276.83	7 621.56	7 547.07	7 758.98	8 362.30	7 231.98	-33.59
11 036.32	10 802.25	10 299.77	9 238.13	9 431.55	9 160.45	8 206.81	7 545.60	7 465.25	7 670.97	8 268.12	7 068.07	-35.02
943.28	1 071.31	1 290.07	1 442.09	1 479.48	1 461.82	1 559.19	1 738.90	1 821.60	1 882.52	1 936.25	1 996.06	100.00
360.90	222.60	82.22	208.79	307.36	154.27	158.80	180.47	201.87	115.78	85.44	178.99	-89.79
111.52	129.06	112.03	99.91	84.34	85.97	75.03	81.13	91.19	97.15	111.15	116.30	-93.00
145 309.94	**144 543.79**	**142 953.05**	**144 832.65**	**145 886.08**	**141 975.26**	**137 249.95**	**132 437.09**	**135 420.76**	**123 146.88**	**130 425.10**	**118 903.17**	**-16.37**
145 991.73	**145 400.79**	**144 294.97**	**146 226.07**	**147 164.87**	**143 268.86**	**138 505.03**	**133 669.98**	**136 645.41**	**124 467.74**	**131 782.33**	**120 171.51**	**-16.02**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)
1. Energy	112 375.42	115 174.16	113 663.59	112 732.66	115 918.10	116 461.41	121 251.38	115 197.31	121 371.38	115 550.79
2. Industrial Processes	15 776.41	15 102.76	15 382.30	15 474.27	18 015.10	19 223.16	18 854.31	16 386.26	15 898.32	15 550.48
3. Solvent and Other Product Use	213.41	210.34	209.27	207.23	204.46	200.18	199.42	198.84	197.74	196.51
4. Agriculture	11 316.65	11 181.60	11 102.95	11 203.20	11 206.04	11 390.97	11 165.12	11 120.78	11 145.15	11 209.87
5. Land Use, Land-Use Change and Forestry[(5)]	-913.71	-636.09	-929.54	-854.42	-877.06	-717.76	-259.17	-775.31	-667.96	-703.26
6. Waste	3 412.92	3 411.02	3 438.06	3 227.03	3 234.76	3 132.19	2 966.48	2 958.78	2 821.18	2 720.17
7. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (including LULUCF)[(5)]	**142 181.11**	**144 443.80**	**142 866.63**	**141 989.97**	**147 701.39**	**149 690.16**	**154 177.55**	**145 086.66**	**150 765.80**	**144 524.57**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change from base to latest reported year
CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(%)
116 993.79	117 510.84	116 155.73	119 397.57	119 786.48	116 235.48	112 411.44	108 102.13	111 417.63	101 934.63	108 155.67	97 698.27	-13.06
15 658.05	14 933.72	15 365.36	14 781.70	15 358.67	15 320.26	14 541.57	13 954.72	13 888.66	11 231.47	12 219.69	11 283.05	-28.48
213.52	213.36	212.88	212.73	212.70	212.36	211.96	212.12	212.00	211.58	211.20	211.13	-1.07
10 529.06	10 408.74	10 186.85	9 711.75	9 662.39	9 449.59	9 325.20	9 396.83	9 258.99	9 359.44	9 427.23	9 365.88	-17.24
-681.79	-857.00	-1 341.92	-1 393.42	-1 278.79	-1 293.60	-1 255.08	-1 232.88	-1 224.65	-1 320.86	-1 357.23	-1 268.35	38.81
2 597.30	2 334.14	2 374.15	2 122.33	2 144.64	2 051.16	2 014.86	2 004.19	1 868.12	1 730.62	1 768.53	1 613.18	-52.73
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
145 309.94	**144 543.79**	**142 953.05**	**144 832.65**	**145 886.08**	**141 975.26**	**137 249.95**	**132 437.09**	**135 420.76**	**123 146.88**	**130 425.10**	**118 903.17**	**-16.37**

Annex 3. PAM inventory table

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation
EP-A01	Green and/or CHP certificates	Energy production	CO_2	Increase profitability of electricity production from RES and CHP Flemish Region (authority: VREG): Green certificates and CGP certificates are separate instruments 1/ The share of electricity supplies covered by RES should reach 6% by 2010 and 13% by 2020 2/ The share covered by CHP should be 19% in 2010 (and a higher share by 2020) Walloon Region (authority CwAPE): Both high efficiency CHP and RES electricity productions generate green certificates. 26.7% of electricity supplies should be covered by 2015, 37.9% by 2020, yielding 8000 GWh of electricity from RES.	Economic	implemented
EP-A02	Support for electricity production from RES	Energy production	CO_2	Increase profitability of electricity production from RES and CHP	Fiscal	implemented
EP-A03	End of tax exemption on coal and heavy fuel	Energy production	CO_2	Discourage the use of coal and heavy fuel in power plants	Information	implemented
EP-A04	Facilitators services for RES and CHP promotion	Energy production	CO_2	Promotion of RES and high efficiency CHP	Information	implemented
EP-A05	Action plan for RES and CHP	Energy production	CO_2	Development of biomass/off-shore wind energy /CHP	Economic	implemented

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Principle of a system of green certificates: 1. A green certificate is allocated to a producer of green electricity every time its production avoids the emission of a fixed amount of CO_2, if it had to be produced in a reference fossil fuel plant (natural gas CCGT). 2. Each year, a predefined (and annually increasing) percentage of electricity supplied to end users has to be covered by green electricity. Suppliers must restitute the necessary number of green certificates to demonstrate that they respect that rule. In case of failure, a penalty fee is due. This situation creates a market for green certificates for the benefit of green electricity producers. In Flanders, a similar process is established for CHP, while CHP is integrated in the green certificates system in Brussels and Wallonia. Green certificates and CHP certificates: share of electricity sales to be covered by RES and/or high efficiency CHP. Guaranteed minimum income for suppliers of green energy. Shares are regularly updated by regional regulation authorities.	2004	FED: Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2) Flanders: VEA, VREG Wallonia: CwAPE Brussels: IBGE, Brugel	623.48	8 241	10 947
Financial support for electricity generation from RES through subsidies	2004	FED: Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2) Flanders: VEA, VREG Wallonia: DGO4 Energie & DGO6 Economie Brussels: IBGE, Sibelga	Impact included in evaluation of EP-A01	Impact included in EP-A01	Impact included in EP-A01
Exemption from excise has been suppressed & an excise duty on energy for coal and heavy fuel oil products has been established Act of 07/12/2006 amending the excise duty rate for certain energy products (Published in 29/12/2006)	2004	FED: Finance FPS	Impact included in evaluation of EP-A01	Impact included in EP-A01	Impact included in EP-A01
Facilitators perform promotional actions and provide guidance and technical support to projects holders. They also identify technical and non technical barriers and formulate proposals to lift them. Facilitators exist for each RES technology (windmills, biomethanisation, wood energy, biofuels, mini hydro-electricity, PV electricity,... as well as for CHP	2004	Flanders: VEA Brussels: IBGE Wallonia: DGO4 Energie	Impact included in evaluation of EP-A01	Impact included in EP-A01	Impact included in EP-A01
Action Plan for renewable energy and CHP. This PaM gathers various plans to promote electricity from RES. The major plan is the development of a large offshore wind farm in the North Sea, aiming at a total capacity of 2 200 MW (recently reviewed from 2 000 MW). Other plans concern notably on-shore windfarms and CHP	2004	FED: Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2) Flanders: VEA Wallonia: DGO4 Energy	30.40	1 164	2 356

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
EP-B01	ETS: specific policy for quota allocation to electricity producers	Energy production	CO_2	Establishment of the ETS system in Belgian law; allocations of quotas to reduce GHG emissions from the electricity sector	Economic	implemented	
EP-B02	Energy planning by electricity producers	Energy production	CO_2	Energy efficiency improvement and GHG emission reductions in the electricity production sector.	Planning	implemented	
EC-A01	Promotion of rational use of energy by electricity distribution companies as part of their public service obligation	Conservation of energy	CO_2	Promote energy savings through electricity distributors	Economic	implemented	
EC-A02	Mobilizing the resources of the natural gas fund	Conservation of energy	CO_2	Rational use of energy, extension of natural gas network and security actions	Economic	implemented	
EC-A03	Energy performance and certificate of buildings	Conservation of energy	CO_2	Improving the energy efficiency of buildings (by transposition of the EC directive on energy performance of buildings and establishment of the methodology to be used to evaluate the performance of buildings)	Regulatory	implemented	
EC-A04	Appointment of accredited energy experts	Conservation of energy	CO_2	Providing the necessary expertise and information to individuals (and businesses) eager to increase the energy efficiency of their buildings	Information	implemented	
EC-A05	Promotion of energy efficient electrical appliances	Conservation of energy	CO_2	Reducing electricity consumption by individuals	Economic	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Specific improvement for allocation of emission quotas to power plants	2004	Health, Food Chain Safety and Environment FPS - DG Environment (register) Flanders: VEA, LNE Brussels: IBGE Wallonia: AwAC	Impact included in evaluation of EP-A01	Impact included in EP-A01	Impact included in EP-A01
Energy planning is required from every high energy consumer industrial site in the Flemish Region. The electricity sector is included in this regulation	2004	Flanders: VEA	NE	NE	NE
In Flanders, the energy distributor manages a compulsory programme promoting RUE among customers, featuring information, demonstrations, various energy services and financial supports for actions and improvements.	2004	Flanders: VEA Brussels: IBGE, Sibelga	Impact included (partly) in evaluation of EC-B01	Impact partly included in EC-B01	Impact partly included in EC-B01
An initial fund managed by natural gas distribution companies, it has now been re-allocated to the Regions for RUE actions, extension of the gas network and security actions.	2004	Flanders: VEA Brussels: Sibelga	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Energy performance and certification of buildings (legal and methodological aspects): actions taken in order to transpose the directive including development of the methodology needed to quantify regulations for new buildings and the performance of existing buildings for certification.	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE	2.44	72	147
Accreditation of energy experts based on specific criteria to guarantee their expertise	2004	Flanders: VEA Brussels: IBGE	Included in EC-B01	NE	NE
By promoting energy efficient electric appliances through performance standards and labelling. In addition, premiums are offered with the purchase of efficient appliances.	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2) Brussels: IBGE, Sibelga	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
EC-B01	Financial support to RUE and RES in the residential sector	Conservation of energy	CO_2	Reducing energy consumptions in dwellings. Efforts beyond what the regulation imposes are rewarded.	Economic	implemented	
EC-B02	Efficiency and emission regulation for boilers and stoves in the residential sector	Conservation of energy	CO_2	Establishing minimum efficiency requirements boilers, stoves and HVAC systems	Regulatory	expired	
EC-B03	Specific support for RUE initiatives for people with low incomes	Conservation of energy	CO_2	Supporting RUE actions on low wages dwellings, which are often bad energy performers	Economic	planned	
EC-B04	Improvement of consumer information on the environmental impact of products	Conservation of energy	CO_2	Environmental labelling requirements, standardized methodologies to evaluate environmental impact of products and equipment	Information	implemented	
EC-B05	Energy performance of buildings (residential sector)	Conservation of energy	CO_2	Transposition of the EC directive on energy performance of buildings	Regulatory	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Financial incentives for the rational use of energy (RUE) and RES: combination of regional subsidies and federal tax deduction for investments generating energy savings. Covers most equipment such as wall insulation, high performance double glazing, condensing boilers, heating system regulations, efficient hot water heaters and heat pumps. In Wallonia, application for subsidies can be submitted directly or through the "Alliance for Employment and Environment", proposing conventions between house owners and the authority: individuals commit to realize a package of investments (minimum one action on the building envelope and one on the heating/SHW system) and authorities provide subsidies and offer a 0% interest loan to cover the additional expense. The tax deduction was discontinued in January 2012, except for roof insulation (albeit at a lower rate).	2004	FED: Finance FPS Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE, Sibelga	3 552.40	989	1 823
Specific constraints on boilers: standards on CO, PM and NOx emissions and energy efficiency. Compulsory on site inspections on a regular basis to ensure standards are met.	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Flanders: VEA, LNE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Specific RUE aid for unprivileged people. Flanders: establishment of a fund to help them finance RUE initiatives, higher subsidies, social roof insulation projects for rental houses, … Wallonia:special subsidies for people who do not pay income taxes (and thus cannot benefit from tax deductions)	2004	Flanders: VEA Brussels: IBGE, AATL Wallonia: DGO4 Energie	0.15	3	6
Improve information available to consumers to promote products with low environmental impacts	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2)	NE	NE	NE
Imposition of energy requirements (Energy Performance Decree standard) to homes and apartments Flanders: the requirements for new buildings are tightened step by step so as to reach nearly energy neutral new buildings in 2021. The information on the energy certificates of buildings is gradually expanded so as to better inform (potential) owners and users of buildings. Wallonia: same procedure, however only recent stages have been officially decided. Brussels Capital Region: The Government's decree of 21 December 2007 on EPB stipulates that new buildings have to be passive and heavily renovated ones very low energy starting in 2015.	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE	Impact included in EC-A03	Impact included in EC-A03	Impact included in EC-A03

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
EC-B05 bis	Energy performance and certification of buildings (residential) - WAM	Conservation of energy	CO_2	Improving the energy efficiency of buildings (by transposition of the EC directive on energy performance of buildings and establishment of the methodology to be used to evaluate the performance of buildings)	Regulatory	planned	
EC-B06	Adaptation of urbanistic regulations to facilitate the promotion of RUE and RES in the residential sector	Conservation of energy	CO_2	Integrainge energy conservation and climate change considerations in spatial planning by modifying territorial planning code	Regulatory	implemented	
EC-C01	Third party financing in the public sector	Conservation of energy	CO_2	Promoting energy savings in public buildings (federal level)	Economic	implemented	
EC-C02	Energy and environmental performance and indoor climatic requirements in buildings of the services and community sectors	Conservation of energy	CO_2	Transposing the energy performance of buildings directive for the tertiary sector	Regulatory	implemented	
EC-C02bis	Energy performance and certification of buildings (services and communities sectors) - WAM	Conservation of energy	CO_2	Improving the energy efficiency of buildings (by transposition of the EC directive on energy performance of buildings and establishment of the methodology to be used to evaluate the performance of buildings)	Regulatory	planned	
EC-C03	Specific energy efficiency measures in the medical, social and education sectors	Conservation of energy	CO_2	Providing incentives to local authorities and associated institutions to improve the energy efficiency of their building stocks	Economic	adopted	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Additional steps in the energy performance of buildings (partim residential sector): Flanders: stricter requirements Wallonia: completing application schedule up to 2020	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE	NE	32	63
Optimizing spatial planning requirements in the context of energy efficient building and renovation. For instance, currently, external insulation of buildings in cities can be prohibited if the thickness of the insulation reduces the area of the sidewalk	2004	Flanders: Rural planning Wallonia: DGO4 Aménagement du territoire	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Using a third party investor fund in the public sector	2004	FEDESCO (Federal Energy Services Company): a limited company under private law.	19.80	116	132
Imposing energy requirements (including indoor) to tertiary buildings (Energy Performance Decree standard) Brussels Capital Region: The Government's decree of 21 December 2007 regarding EPB stipulates that new buildings has to be passive and heavy renovated ones very low energy starting in 2015	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE	NE	58	172
Additional steps in the energy performance of buildings (part-time tertiary sector): Flanders: stricter requirements Wallonia: completing application schedule up to 2020	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE	NE	47	94
Subsidies (up to 30% of total investment) to promote RUE in hospitals, retirement homes, social infrastructures and schools + test cases and demonstration projects	2004	Flanders: VIPA, VMSW, AGIOn, GO! Wallonia: DGO4 Energie Brussels: IBGE	35.06	65	90

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
EC-C04	Energy and environmental performance and indoor climatic requirements in industrial buildings	Conservation of energy	CO_2	Transposition of the Directive on the energy performance of buildings to the industrial sector	Regulatory	implemented	
EC-C05	Financial support for sustainable energy policies in sheltered and social workshops	Conservation of energy	CO_2	RUE in sheltered and social workshops	Economic	implemented	
IP-A01	Implementation of the ETS in the industrial sector	Industrial processes	CO_2	Reducing emissions from the industry sector involved in ETS	Regulatory	implemented	
IP-A02	Long Term Energy/ CO_2 efficiency Agreements in the industrial sector	Industrial processes	CO_2	Improving energy efficiency in industries, by raising profitability criteria for RUE investments from a BAU 2 years of payback time to an IRR of 12.5% through an agreement (Flanders)	Voluntary/ negotiated agreement	implemented	
IP-A02 bis	Long Term Energy/ CO_2 efficiency agreements in the industrial sector (WAM)	Industrial processes	CO_2	Improving energy efficiency in industries, by raising profitability criteria for RUE investments from a BAU 2 years of payback time to 5 years within an agreement (Wallonia)	Voluntary/ negotiated agreement	planned	
IP-A03	Energy planning in industries	Industrial processes	CO_2	Increasing energy and CO_2 awareness in industries	Information	implemented	
IP-A04	Reference Centres and industrial "clusters"	Industrial processes	CO_2	Creating synergies and creativity among complementing industries in specific markets	Other	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Imposition of energy requirements (including indoor) to industrial buildings (Energy Performance Decree standard)	2004	Brussels: IBGE Wallonia: DGO4 Energie Flanders: VEA	NE	NE	NE
Specific financial mechanisms to protect low income populations	2004	Flanders: WSE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Belgian National Allocation Plan 2008-2012 European system on scope 2013-2020	2004	Flanders: LNE Wallonia: AwAC Brussels: IBGE	Impact included in evaluation of IP-A02	Impact included in IP-A02	Impact included in IP-A02
Benchmarking and voluntary agreements through contracts signed with public authorities. Enterprises (directly or through their professional associations) make a voluntary commitment to improve their energy efficiency within a certain time horizon. Targets are quantified by benchmarking (within 10% of the best performer) or by energy audit, considering all RUE investments which have an IRR of 12.5%. Considered separately from Wallonia because it is considered in projections the WEM scenario	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE Industrial associations	2 119	856	1 800
Voluntary agreements through contracts signed with public authorities. Enterprises (directly or through their professional associations) make a voluntary commitment to improve their energy efficiency within a certain time horizon. Targets are quantified by energy audit, considering all RUE investments which have a payback time under 5 years Considered separately from Flanders because it is not considered in projections the WEM scenario	2004	Flanders: VEA Wallonia: DGO4 Energie Brussels: IBGE Industrial associations		1 249	1 708
Compulsory drafting of energy plans by industries in Flanders. Commitments issued from voluntary agreements (see EC-$C0_2$) are accepted as energy plans.	2004	Flanders: VEA	Included in IP-A02	128	351
Creating clustered structures to induce synergies among enterprises involved in energy technologies	2004	Flanders: VEA Wallonia: DGO6 Economy Brussels: IBGE	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
IP-A05	Promoting sustainable industrial estates	Industrial processes	CO_2	Attracting industries in specific activity zones where they can benefit from energy system integration and/or intermodal infrastructure for transport	Planning	implemented	
IP-A06	Specific financial measures and ecology premiums for industry	Industrial processes	CO_2	Financial supports to RUE investments in industries	Economic	implemented	
IP-B01	HFC and PFC emissions reduction targets	Industrial processes	HFC PFC	Reduction of F-gas emissions	Education	implemented	
IP-B02	SF_6 emissions reductions	Industrial processes	SF_6	Reducing SF_6-emissions from high-voltage switches	Education	implemented	
IP-C01	Specific emission reduction agreement with nitric acid producers	Industrial processes	N_2O	Reducing N_2O emissions from nitric acid production	Voluntary/ negotiated agreement	implemented	
IP-C02	Specific emission reduction agreement with caprolactam producers	Industrial processes	N_2O	Flemish Region: A reduction of N_2O emissions from the production of caprolactam	Voluntary/ negotiated agreement	implemented	
TR-A01	Mobility plans at local level	Transports	CO_2	Improving alternative transport modes for the journey to work	Planning	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Promoting sustainable industrial sites which encourage transport modal shifts, promote energy integration networks (connecting energy demand and energy production processes) and produce heat and electricity as by-products, which are then distributed within industries.	2004	Wallonia: DGO6 Economy	NE	NE	NE
Specific financial measures and ecology premiums: tax deduction and subsidies for energy saving investments in industry	2004	FED: Finance FPS	Impact included in IP-A02	9	17
Reducing the use of fluorinated greenhouse gases (HFCs and PFCs) by training certified personnel in handling the gas when installing and maintaining refrigeration systems	2004	FED: Mobility and Transport FPS Health, Food Chain Safety and Environment FPS - DG Environment Flanders: LNE Brussels: IBGE Wallonia: AwAC	NE	NE	NE
Reduce SF_6-emissions through compulsory certification of personnel involved in the recovery, collection, recycling, regeneration and destruction of SF_6 from high-voltage switches	2004	Flanders: LNE	NE	NE	NE
Covenants to reduce N_2O emissions from nitric acid production. Required actions are concluded. Emission reductions are effective	2004	Flanders: LNE Wallonia: AwAC Brussels: IBGE	2 705	3 361	3 361
The N_2O emissions are generated by a caprolactam production site located in the Flemish Region. The Flemish Government is conducting a study in cooperation with this company to identify additional cost efficient measures on the site. On the basis of the results of this study, a decision will be made between several policy options to ensure the identified measures are carried out.	2004	Flanders: LNE	NE	NE	NE
Federal state: Survey “Journey to work” for companies with 100 people or more (legal obligation). The publication of the results encourages companies to realize an Action Plan for the transport of their employees. A study is planned to return the survey results more efficiency back to the firms. Brussels: Improve mobility plans at local level (schools, enterprises and businesses) by promoting car-sharing and alternatives transport modes.	2004	FED: Mobility and Transport FPS Brussels: IBGE, AED, communes Wallonia: DGO2 Mobilité	NE	14	15

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation
TR-A02	Improve and promote public transport	Transports	CO_2	Intensifying the modal shift from individual cars towards public transports (trains, buses, tramways and subways) but also towards alternative “soft” transport means (bicycles and pedestrians)	Planning	implemented
TR-A03	Promote the use of bicycles	Transports	CO_2	Increasing the share of bicycles in the modal split.	Economic	implemented
TR-A04	Promote multimodal freight transport	Transports	CO_2	An increase of the share of alternative transport in the modal split for freight.	Economic	implemented
TR-A05	Improve road transport efficiency	Transports	CO_2	Smooth travel on roads	Economic	implemented
TR-A06	Parking regulations	Transports	CO_2	Urban planning: promoting available public parking and discouraging surface parking and endless search for parking places	Regulatory	implemented
TR-A07	Taxation of road transport	Transports	CO_2	Discouraging the use of individual cars in certain areas. Promoting the purchase of efficient and clean vehicles	Fiscal	planned

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Improve and promote public transport by: - setting quantified targets with the authorities and including them into their management conventions to increase the use of public transport. - improving infrastructures and services - creating new parking places for cars and bicycles close to train stations - reducing fares for certain categories of travellers - promoting the combined use of bicycle and public transport and therefore including the promotion of bicycles as an objective of public transport companies Federal state: Implementation of Regional Express Network (RER) + Improving the quality of rail services (Measures of the Federal Plan for Sustainable development nr2: 32804-1, 32808-2, 32812-2, 32808-1, 32813-1, 32813-2, 32814-1 and -2, 32806-3)	2004	FED: Mobility and Transport FPS Brussels: IBGE, AED, STIB Flanders: De Lijn, MOW Wallonia: TEC	1 473.25	2 386	3 440
Promote the use of bicycles by creating or improving infrastructures such as parking facilities. Promotion of cycling through public transport companies. Federal state: to improve the intermodality rail-bikes: Measure of the Federal Plan for Sustainable Development nr2: - 32815-4: installation of bike points and secure parking for bikes at railway stations	2004	FED: Finance FPS Mobility and Transport FPS Brussels: AED, IBGE Flanders: MOW	5.04	13	15
Federal state: Rail: - Standardisation of containers 467-a, ITS containers 467-b - Construction of new infrastructures and improvement of existing infrastructures - Offering subsidies for domestic freight transport by train. Waterways: - financial support to the profession - financial support for the purchase of energy efficient barges.	2004	FED: Mobility and Transport FPS Wallonia: DGO2 Voies navigables et intermodalité Brussels: Port de Bruxelles Flanders: MOW	35.27	47	62
Improvement of transport efficiency through congestion/traffic jam management and traffic regulation	2004	Brussels: AED	NE	NE	NE
Urban constraints on parking	2004	Brussels: IBGE, AED, AATL, communes	Impact included in TR-A02	Impact included in TR-A02	Impact included in TR-A02
Greening taxation on road transport	2004	Brussels: AFB, AED, IBGE	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
TR-A08	Free public transport for commuters	Transports	CO_2	Promoting the use of public transport	Economic	implemented	
TR-B01	Promotion of car-pooling	Transports	CO_2	Flemish Region: An increase of the seat occupancy in commuter traffic from 1.2 to 1.3 (average seat occupancy target of 1.4)	Regulatory	implemented	
TR-B02	Promotion of car sharing	Transports	CO_2	Reducing the number of cars on the road	Planning	implemented	
TR-B03	Promotion of teleworking	Transports	CO_2	Promoting teleworking of general public to reduce mobility needs	Regulatory	expired	
TR-B04	Improve freight transport efficiency	Transports	CO_2	Improving freight transport efficiency	Voluntary/ negotiated agreement	implemented	
TR-B05	Ecodriving	Transports	CO_2	Smooth traffic and reduced emissions by teaching eco-driving	Education	implemented	
TR-C01	Tax deductions for the purchase of new clean vehicles	Transports	CO_2	Promoting the purchase of clean cars	Fiscal	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Free public transport for commuters. Under social regulations, 80% of the travel costs of workers (by train) paid by their employer. This policy ensures that the remaining 20% are paid by the public authorities. (Measure of the Federal Plan for Sustainable Development nr2: 32809-1)	2004	FED: Mobility and Transport FPS	Impact included in TR-A02	Impact included in TR-A02	Impact included in TR-A02
Measure of the Federal Plan for Sustainable Development nr2: - 455c: * Changing the rules of the road, allowing road managers to open a road lane reserved for buses, cars occupied by several people, vehicles used for the transportation company (journey to work). - Extension of Liability (Compulsory Insurance) coverage for carpools. - Insurance on work accidents (mandatory for companies) indemnify the incapacity of the driver and passengers. The journey to work required may include a visit to the collection of carpoolers. - The compensation paid by the employer for the journey to work is not taxable. - The driver can deduct EUR 0.15 / km from taxes without having to declare the compensation paid by carpoolers.	2004	FED: Finance FPS Mobility and Transport FPS Flanders: MOW	11.69	11	13
Promotion of car-sharing The railroad company participates in the organization of shared cars (type Cambio) by reserving parking places for cars shared close to railway stations.	2004	Brussels: IBGE Flanders: Mow	NE	NE	NE
Promote teleworking	2004	FED: Personnel and Organisation FPS	NE	NE	NE
Optimizing timetables, loading and unloading procedures and the logistics of freight transport by road	2004	Brussels: Port de Bruxelles Flanders: MOW	NE	NE	NE
Promotion of eco-driving by training professional drivers (buses, public transports and lorry drivers) Measure of the Federal Plan for Sustainable Development nr2: - 455-C: transposition of directive 2003/59: driver eco training - 32810-1 power efficiency of engines and ecodriving of truck drivers: monitoring of EU standard	2004	FED: Mobility and Transport FPS Wallonia: TEC Brussels: STIB Flanders: De Lijn, MOW, LNE	5.52	26	62
Tax deduction when purchasing clean vehicles: Automatic reduction in purchase to individuals was discontinued in January 2012. A recalculation of the benefit in kind was introduced for company cars. Until end 2012, financial help for the purchase of an electric vehicle (limited to EUR 9 190).	2004	FED: Finance FPS + Mobility and Transport FPS + Health, Food Chain Safety and Environment FPS - DG Environment	41.38	175	156

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
TR-C02	Promoting the purchase of clean vehicles	Transports	CO_2	Promoting the purchase of clean cars	Information	implemented	
TR-C03	Vehicles' environmental impacts appraisal (ECOSCORE) and adaptation of taxes	Transports	CO_2	Promoting the purchase of clean cars	Fiscal	implemented	
TR-C04	Specific support for the construction of clean vehicles	Transports	CO_2	Promoting clean cars	Research	implemented	
TR-C05	Best Available Technology for public transport	Transports	CO_2	Promoting clean vehicles in public transport	Regulatory	implemented	
TR-D01	Promoting biofuels	Transports	CO_2	Reaching 5.75% biofuels in 2010	Fiscal	implemented	
AG-A01	Reducing emissions from cultivation that uses greenhouses (glasshouses)	Agriculture and forestry	CO_2	The vast majority of the Belgian greenhouse cultivation takes place in the Flemish Region, the rest is in the Walloon Region Flemish Region: increase the share of natural gas and other more sustainable energy sources (CHP, biomass,...) in energy consumption by greenhouses cultivation Walloon Region: reducing energy related CO_2 emissions from greenhouse cultivation through RUE	Economic	implemented	
AG-A02	Financial incentives for rational use of energy in agriculture	Agriculture and forestry	CO_2	Support for farmers to use energy rationally	Economic	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Promoting the purchase of clean vehicles by advertising CO_2 emissions controlled and annual publication containing information on CO_2 emissions of all new vehicles on the Belgian market and identifying clean vehicles eligible for fiscal deduction. Bonuses and penalties exist in the Walloon system for buying a private vehicle according to CO_2 emissions for both new and used cars.	2004	FED: Mobility and Transport FPS Wallonia DGO2 Budget	Impact included in TR-C01	11	11
Environmental Impact Assessment of vehicles, reformation of the road fund tax and the tax on entry into service (ECOSCORE)	2004	Wallonia: AwAC Brussels: IBGE Flanders: LNE	Impact included in TR-C01	Impact included in TR-C01	Impact included in TR-C01
Specific support for the construction of clean vehicles	2004	Wallonia: DGO6 Economie	NE	NE	NE
Purchase of clean vehicles for public transport	2004	Wallonia: TEC Brussels: STIB Flanders: De Lijn	NE	NE	NE
Tax exemption for biofuels	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment + Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2)	616.78	895	895
Subsidies, information, promotion of CHP and HP, investigation of available residual energy/CO_2 from industry to be recycled in greenhouses. In the Walloon region, a subsidy is available to support the design of high efficiency greenhouses.	2004	Wallonia: DGO4 Energie Flanders: LV, VEA	NE	NE	NE
Financial instruments available for RUE and RES in the private sectors are also made available for agriculture. Moreover, specific financial instruments exist for the agriculture sector (Flanders)	2004	Energy adm + Flanders also LV	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation
AG-B01	Reduction of GHG emissions from fertilizers and manure usage	Agriculture and forestry	N_2O CH_4	Managing and controlling the use of manure and fertilisers	Information	implemented
AG-C01	Limiting deforestation and promoting reforestation	Agriculture and forestry	CO_2	Maintaining the CO_2 sink potential of Belgian forests	Economic	implemented
AG-C02	Preserve the ecological stability of forests (certification)	Agriculture and forestry	CO_2	Preserving the ecological stability of forests	Regulatory	implemented
AG-D01	Wood-energy plan	Agriculture and forestry	CO_2	Wood energy projects in rural areas	Economic	implemented
AG-D02	Promote dedicated energy crops	Agriculture and forestry	CO_2	Flemish Region: promotion of (dedicated) energy crops Walloon Region: pilot projects	Economic	implemented
AG-D03	Specific support to promote biomethanisation	Agriculture and forestry	CO_2 CH_4	Promotion of biomethanisation in agricultural establishments	Economic	implemented
AG-D04	Quality standards for biofuels (wood pellets)	Agriculture and forestry	CO_2 N_2O	Enhancing solid biomass markets, creating confidence in wood-energy products	Regulatory	implemented

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Rural development plans are supplemented by specific measures on the rational use of organic and nitrogen based fertilizers. Such policies initially aimed at reducing the stress of pollution on surface and underground waters contribute to the reduction of N_2O and CH_4 emissions. Reductions in livestock sizes are also expected and should also contribute to emissions reductions. Moreover, cross compliance regulations aim to protect pastures: prohibiting pastures reductions, regulating carbon and acidity contents and using measures to combat erosion.	2004	administrations of agriculture	NE	NE	NE
Limiting deforestation and encouraging reforestation	2004	Brussels: IBGE Other regions: relevant administrations in collaboration with AwAC(Wallonia) or LNE (Flanders)	NE	NE	NE
Certification FSC & PEFC of forests	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Brussels: IBGE Other regions: relevant administrations in collaboration with AwAC(Wallonia) or LNE (Flanders)	NE	NE	NE
Wallonia: Promotion of wood energy installations (wood heat generators, gasification of wood chips, other valorisation techniques). The main target of the plan are collectivites and municipalities	2004	Wallonia: DGO4 Energy and walloon rural foundation	NE	NE	NE
Promotion of (dedicated) energy crops	2004	Flemish Region Wallonia: DGO4 Energy, & walloon rural foundation	NE	NE	NE
Specific measures to promote the sector of biomethanisation by the Walloon Region (federal Law Gazette, 13/11/2008)	2004	Wallonia: DO4 Energie & DGO3 Agriculture	NE	NE	NE
The federal State establishes quality standards for solid biofuels to enhance the market and promotes a purchasing policy preferential to certified wood.	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment + Economy, SME, Self-Employed and Energy FPS - DG Energy (E2) + Finance FPS	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
WA-A01	Minimise quantities of wastes dumped into landfills	Waste	CH_4	Waste generation prevention	Regulatory	implemented	
WA-B01	Optimize incineration of wastes	Waste	CO_2	Promoting energy from waste	Economic	implemented	
WA-C01	Landfill gas flaring and recuperation	Waste	CH_4	Recuperation and use of biogas	Economic	implemented	
WA-D01	Biomass flows management	Waste	CH_4	Quality control of biomass flows	Regulatory	implemented	
WA-E01	Waste refrigerating fluids recuperation and management	Waste	HFC	Improving F-gases management in automobile maintenance	Education	implemented	
SE-A01	Climate Change Awareness	Cross cutting	CO_2, CH_4, N_2O, HFC, PFC, SF_6	Raising climate change awareness of the public	Information	implemented	
SE-A02	Tools to promote rational energy use and renewable energy	Cross cutting	CO_2	Producing tools to provide information and raise awareness, for example brochures, CO_2 calculators, energy simulators etc to promote rational energy use and renewable energy	Information	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Minimise quantity of waste into landfill	2004	FED: Finance FPS Health, Food Chain Safety and Environment FPS - DG Environment + Economy, SME, Self-Employed and Energy FPS - DG Energy (E2) Brussels: IBGE Wallonia: DGO3 Waste management Flanders: OVAM	NE	NE	NE
Optimization of new waste incineration (incinerators)	2004	Brussels: ABP Flanders: OVAM	NE	NE	NE
All landfills in operation are equipped with biogas recovery and valorising biogas to produce electricity by generating green certificates to help support the costs. Former landfills, which are out of operation are equipped with flaring devices. In accordance with EC Directive 1999/31/EC, organic waste is no longer accepted in landfills.	2004	Flanders: OVAM Wallonia: DGO3: waste mangement	NE	NE	NE
Manage and quality control of biomass available for material recuperation or for energy usage	2004	Brussels: IBGE, ABP	NE	0	0
Reducing F-gas emissions through training certified personnel	2004	Brussels: IBGE Flanders: LNE	NE	NE	NE
Websites, brochures, information campaigns, …	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Brussels: IBGE Wallonia: AwAC, DGO4 Energy Flanders: LNE, VEA	NE	NE	NE
Development of communication tools concerning climate change	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Brussels: IBGE Wallonia: AwAC, DGO4 Energy Flanders: LNE, VEA	NE	Impact included in EC-B01	Impact included in EC-B01

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
SE-A03	Environmental awareness in schools	Cross cutting	CO_2	Using tools to increase awareness on climate change among students and teachers	Education	implemented	
SE-A04	Ecocampus	Cross cutting	CO_2	Increasing environmental awareness - including climate change awareness of university students	Education	implemented	
SE-A05	Financial support for energy counsellors in interprofessional organisations	Cross cutting	CO_2	Promoting RUE and RES in SMEs through information provision by professional organizations	Economic	implemented	
SE-A06	Training of energy managers	Cross cutting	CO_2	Establishing energy/CO_2 skills among managers of large buildings in the tertiary sector	Education	implemented	
SE-A07	Support to local initiatives	Cross cutting	CO_2	Supporting initiatives by citizens to increase awareness of saving energy and climate change issues	Economic	implemented	
SE-A08	Urban policy	Cross cutting	CO_2 CH_4 N_2O	Recognising and supporting the importance of large cities management	Other	implemented	
SE-B01	Supporting sustainable cooling systems in dwellings	Cross cutting	CO_2	Feasibility projects to demonstrate alternative methods to conventional HVAC	Education	expired	
SE-B02	Guidance on rational use of energy to low income communities	Cross cutting	CO_2	Improving and demonstrating RUE in public housing	Economic	planned	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Environmental Care at School (MOS project)	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Brussels: IBGE Wallonia: AwAC, DGO4 Energy Flanders: LNE, VEA	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Ecocampus programme for Universities	2004	Flanders: LNE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Provision of project grants for energy consultants to inter-professional organizations	2004	Brussels: IBGE Flanders: VEA	NE	NE	NE
Training of energy / Vocational-Technical	2004	Brussels: IBGE Wallonia DGO4 Energy	NE	NE	NE
Action to support local initiatives	2004	FED: Economy, SMEs, Self-Employed and Energy FPS - DG Energy (E2) Brussels: IBGE	NE	NE	NE
Urban Policy	2004	FED: Social Integration, Fight against Poverty and Social Economy PPS - Federal Service for Urban policy	NE	NE	NE
Support to (natural and) renewable cooling	2004	Brussels: IBGE Flanders: relevant administrations LNE, VEA	NE	NE	NE
Supporting residents of disadvantaged groups in rational use of energy to meet rational deal with energy	2004	Brussels: IBGE Flanders: VEA & Bond Beter Leefmilieu Wallonia: DGO4 Energy & CPAS	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
SE-B03	Pilot projects in social housing to evaluate sustainable energy measures	Cross cutting	CO_2	Raising awareness of sustainability in social housing users and providers	Education	implemented	
SE-B04	Awareness of rational energy use in businesses offices	Cross cutting	CO_2	Raising awareness of rational energy use in office buildings	Information	implemented	
SE-B05	Youth, space and environment project	Cross cutting	CO_2	Raising awareness of rational energy use of young people	Education	implemented	
SE-B06	Guidance on rational energy use in adults associations	Cross cutting	CO_2	Supporting RUE by adults	Information	implemented	
SE-B07	Promotion and financial support for energy audits in individual dwellings	Cross cutting	CO_2	Encouraging energy audits in households	Economic	implemented	
SE-B08	Energy counsellors	Cross cutting	CO_2	Promoting RUE in buildings through municipalities	Information	implemented	
SE-B09	Eco-construction	Cross cutting	CO_2	Creating clusters of expertise for RUE in building construction	Planning	implemented	
SE-C01	Training of energy and building professionals	Cross cutting	CO_2	Training professionals in construction	Education	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Evaluating sustainable energy measures through pilot and demonstration projects in social housing	2004	Brussels: IBGE Flanders: VMSW	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Awareness Campaign business offices	2004	Brussels: IBGE, ABE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
JeROM project (Youth, Space and Environment)	2004	Flanders: LNE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
NME for adults (associations)	2004	Flanders: LNE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Proposed energy audits on individuals	2004	Brussels: ABEA Wallonia: DGO4 Energy	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Availability of energy advisors	2004	Brussels: ABEA	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Ecobuild	2004	Brussels: IBGE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01
Training of professionals	2004	Brussels: IBGE	Included in EC-B01	Impact included in EC-B01	Impact included in EC-B01

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
SE-C02	Eco-efficiency scans	Cross cutting	CO_2	Improving eco-efficiency in SMIs (small and medium size industries)	Economic	implemented	
SE-C03	Raise awareness about the reduction of F-gasses in the refrigeration sector	Cross cutting	HFC	Reducing F-gas emissions in the refrigeration sector	Information	implemented	
SE-C04	Social responsibility of businesses	Cross cutting	CO_2	Managing enterprises in coherence with their social and environmental neighbourhood	Information	implemented	
SE-C05	Eco-dynamic label for businesses	Cross cutting	CO_2	Recognising clean enterprises to promote good practice	Information	implemented	
SE-D01	Clean vehicles promotion campaign	Cross cutting	CO_2	Informing the public purchasing choices of clean vehicles	Information	expired	
SE-D02	Eco-driving promotion campaign	Cross cutting	CO_2	Promoting smooth and clean driving	Information	implemented	
SE-D03	Meeting on sustainable mobility needs campaign	Cross cutting	CO_2	Increasing the use of sustainable transport measures	Information	implemented	
SE-E01	Knowledge Centre on energy for agriculture and horticulture	Cross cutting	CO_2	Promoting clean and sustainable agriculture and forestry	Education	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Investments in eco-efficiency of SMEs: improve energy efficiency by designing environmentally friendlier products, adapting production processes and better valorising wastes; examining markets to try to adapt to customers demands and demonstrating benefits of changes (e.g. profitability and better respect of environment)	2004	Regional energy efficiency departments	Included in IP-A02	Impact included in IP-A02	Impact included in IP-A02
Increase specific awareness about cooling needs and solutions through providing information about the relevant legislation and ways to reduce emissions	2004	Flemish Region: LNE Brussels Region: IBGE/BIM Walloon Region: AwAC	NE	NE	NE
Social responsibility of enterprises	2004		NE	NE	NE
The eco-dynamic enterprise label	2004	Brussels: IBGE	NE	NE	NE
Promoting the purchase of clean vehicles	2004	Brussels: IBGE	Impact included in evaluation of TR-C01	Impact included in TR-C01 and TR-C02	Impact included in TR-C01 and TR-C02
Sensitization campaign on eco-driving	2004	Brussels: IBGE Flanders: LNE, MOW	Impact included in evaluation of TR-C01	Impact included in TR-B05	Impact included in TR-B05
Raise awareness of citizens to satisfy their mobility needs in a sustainable way	2004	Brussels: IBGE Flanders: LNE, MOW	NE	NE	NE
Establishment and supporting of an energy centre for agriculture and horticulture	2004	Flanders: LV	NE	NE	NE

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
SE-E02	Environmental accounting/reporting	Cross cutting	CO_2 CH_4 N_2O	Reducing emissions from the agricultural sector by raising awareness of farmers through environmental accounting/reporting	Information	implemented	
OB-A01	Sustainable public procurement	Cross cutting	CO_2	Good example shown by the public administration sector	Economic	implemented	
OB-A02	Sustainable criteria for community catering	Cross cutting	CO_2	Integrating sustainability as an element in the criteria for food purchases	Economic	implemented	
OB-A03	Environmental management system	Cross cutting	CO_2	Public administrations environmental certification and support to other organisations	Planning	implemented	
OB-B01	Rational Use of energy in public buildings	Conservation of energy	CO_2	Good practice shown by public administrations	Planning	implemented	
OB-B02	Third Party Financing in public buildings	Conservation of energy	CO_2	Good practice shown by public administrations	Planning	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Encourage the use of environmental accounting/reporting	2004	Flanders: LV	NE	NE	NE
Sustainable public procurement	2004	FED: pilot: Sustainable Development PPS (Federal Public Planning Services) --> all the federal services should implement this action Brussels: Public bodies	NE	NE	NE
Optimization of catering on the basis of sustainability criteria	2004	FED: Sustainable Development PPS (Federal Public Planning Services)	NE	NE	NE
Establishment of an environmental management system	2004	FED: coordinator: Sustainable Development PPS (Federal Public Planning Services) --> all the federal services should implement the system Brussels: Public bodies	NE	9	14
RUE in public buildings Implementation Federal State Council of Ministers of Leuven of 18 March 2007	2004	FED: Public building (régie des bâtiments); FEDESCO (Federal Energy Services Company) (limited company under private law); SNCB-Holding (public enterprise) for station building Brussels: Public bodies	NE	18	18
Establishment of a third party investor to improve the energy efficiency of public buildings (FEDESCO)	2004	FED: FEDESCO (Federal Energy Services Company) (limited company under private law)	Impact included in evaluation of EC-C01	Impact included in EC-C01	Impact included in EC-C01

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
OB-B03	Promoting rational energy use in local communities	Conservation of energy	CO_2	Support to local initiatives that promote rational energy use	Economic	implemented	
OB-C01	Mobility plan for civil servants of different administrative organisations sharing a common office building	Transports	CO_2	Increasing the use of mobility plans for civil servants of different administrative organisations sharing a common office building to show good practice by public administrations	Planning	implemented	
OB-C02	Promotion of alternative transport in public services	Transports	CO_2	Good practice shown by public administrations	Information	implemented	
OB-C03	Promoting bicycle use in public services	Transports	CO_2	Good practice shown by public administrations	Economic	implemented	
OB-C04	Promoting telework in public services	Transports	CO_2	Increased teleworking by civil servants to show good practice by public administrations	Planning	implemented	
OB-C05	Eco-driving training in public services	Transports	CO_2	Good practice shown by public administrations	Education	implemented	
OB-C06	Offsetting air travel GHG emissions in public administrations	Transports	CO_2	Good practice shown by public administrations	Economic	implemented	
OB-C07	Purchase of clean vehicles by public administrations	Transports	CO_2	Good practice shown by public administrations	Economic	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Promotion of RUE with the municipalities and communities (local authorities)	2004	Brussels: Public bodies, communes, hospitals, schools	NE	NE	NE
Mobility plan	2004	Brussels: Public bodies, companies (>200 employees)	NE	Impact included in TR-A01	Impact included in TR-A01
Stimulating alternative use in transport/ free ride on public transport for members of administrations: free public transport is provided for journey to work in the Federal Public Service and in the Walloon Region.	2004	FED: Mobility and Transport FPS Brussels: Public bodies, companies (>200 employees)	NE	NE	NE
Rewarding the use of bicycles in administrations: financial incentives, purchase of bicycles for service (in Federal public Service) + installation of showers for bicycle users	2004	FED: Finance FPS Mobility and Transport FPS Brussels: Public bodies, companies (>200 employees)	Impact included in evaluation of TR-A03	Impact included in TR-A03	Impact included in TR-A03
Experiences of teleworking in administrations	2004	FED: Personnel and Organisation FPS	NE	NE	NE
Eco-driving	2004	Brussels: STIB	Impact included in evaluation of TR-B05	Impact included in TR-B05	Impact included in TR-B05
Offsetting CO_2 emissions for air transport	2004	FED: Health, Food Chain Safety and Environment FPS - SE B&CG LOG Brussels: Public bodies	NE	NE	NE
Purchase of clean vehicles	2004	FED: Personnel and Organisation FPS --> use by all FPSs Wallonia Brussels: Public bodies, STIB	Impact included in evaluation of TR-C01	Impact included in TR-C01 and TR-C02	Impact included in TR-C01 and TR-C02

Ref	Name of mitigation action	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implemen-tation	
Flexib	Flexibility mechanisms	Cross cutting	CO_2, CH_4, N_2O, HFC, PFC	Purchase flexibility mechanisms during the Kyoto period to reduce emission levels.	Economic	implemented	
Ecoche	Ecocheques	Cross cutting	CO_2	Promotion of ecological goods and services	Economic	implemented	
Green	Green loans	Conservation of energy	CO_2	Providing access to finance energy-saving projects	Economic	implemented	

Brief description	Start year of implementation	Implementing entity (ies)	Estimate of mitigation impact (kt eq CO_2)		
			2009	2015	2020
Purchase flexibility mechanisms during the Kyoto period to reduce emission levels. Federal State: buys emission rights up to 12.2 million tons of CO_2 equivalent during the period 2008-2012 through an annual fund of 25 million euro Flemish Region: 17 Mtonnes CO_2-eq in the Kyoto period (2008-2012) Brussels Capital Region: 0.155 Mt Walloon Region: 0.087 Mt See table 4.10	2004	FED: Health, Food Chain Safety and Environment FPS - DG Environment Brussels: IBGE	NE	NE	NE
Cheques as part of employees pay, intended to finance the acquisition of ecological goods and services. These cheques are exempt from taxes and social contributions.	2009	National Labour Council	19.00	200	58
A temporary measure, only applicable to loans awarded between 1 January 2009 and 31 December 2011.	2009	FED: Finance FPS	3.49	162	162

List of acronyms

	EN		FR		NL	
AATL	-	Public Service for Housing and Spatial Planning	AATL	Administration de l'Aménagement du Territoire et du Logement	BROH	Bestuur Ruimtelijke Ordening en Huisvesting
AAU	AAU	Assigned Amount Unit	UQA	Unité de Quantité Attribuée	-	toegewezen emissie-eenheid
ABE	-	Brussels Enterprise Agency	ABE	Agence Bruxelloise de l'Entreprise	BAO	Brussels Agentschap voor de Onderneming
ABEA	-	Brussels energy agency	ABE(A)	Agence Bruxelloise de l'Energie	(A)BEA	Brussels Energie Agentschap
ABP	-	Brussels agency for cleanliness	ABP	Agence Bruxelles-Propreté	-	Net Brussel
ACI	-	interregional cooperation agreement	ACI	Accord de Coopération Interrégional	-	Interregionaal samenwerkingsakkoord
ACP	ACP	African, Caribbean and Pacific Group of States	ACP	Groupe des Etats d'Afrique, des Caraïbes et du Pacifique	ACS	Groep staten in Afrika, het Caribische gebied en de Stille Oceaan
ACS	ACP	African, Caribbean and Pacific Group of States	ACP	Groupe des Etats d'Afrique, des Caraïbes et du Pacifique	ACS	Staten in Afrika, het Caribische gebied en de Stille Oceaan
ACSYS	ACSYS	Arctic Climate System Study	-	Étude du système climatique de l'Arctique	-	Studie van het Arctisch klimaatsysteem
ACV	LCA	Life-Cycle Assessment	ACV	Analyse du cycle de vie	LCA	Levenscyclusanalyse
ADASCIS	ADASCIS	(Earth Observation to support) Agricultural Damages Assessment System in Crop Insurance Schemes	-	(Les techniques d'observation de la terre comme) support aux systèmes d'évaluation des dégâts dans le cadre des assurances récoltes	-	(Aardobservatie als hulpmiddel bij het) schatten van landbouwschade voor oogstverzekeringen
ADRAO	WARDA	West Africa Rice Development Association	ADRAO	Association pour le développement de la riziculture en Afrique de l'Ouest	-	Organisatie voor de ontwikkeling van de rijstcultuur in West-Afrika
ADSEI	-	Statistics Belgium	DGSIE	Direction Générale Statistique et Information Economique	ADSEI	Algemene Directie Statistiek en Economische Informatie
AED	-	Brussels Mobility	AED	Administration de l'Equipement et des Déplacements (Bruxelles mobilité)	BUV	Bestuur Uitrusting en Vervoer (Mobiel Brussel)
AEE	EEA	European Environment Agency	AEE	Agence européenne de l'environnement	-	Europees Milieuagentschap
AFB	-	Public Service for Finance and Budget	AFB	Administration des Finances et du Budget	BFB	Bestuur Financiën en Begroting
AGACC	AGACC	Advanced exploitation of Ground-based measurements for Atmospheric Chemistry and Climate applications	-	Exploitation avancée de mesures au sol pour l'étude de la chimie atmosphérique et du climat	-	Gevorderde exploitatie van Grondwaarnemingen voor toepassing in Atmosferische Chemie-en Klimaatstudies

	EN		FR		NL	
AGERS	-	General Administration of Education and Scientific Research (Wallonia-Brussels Federation)	AGERS	Administration Générale de l'Enseignement et de la Recherche Scientifique (Fédération Wallonie-Bruxelles)	-	Algemene Administratie voor het Onderwijs en het Wetenschappelijk Onderzoek (Federatie Wallonië-Brussel)
AGION	-	Agency for School Infrastructure	-	Agence pour l'infrastructure dans l'enseignement	AGION	Agentschap voor Infrastructuur in het Onderwijs
AIE	IEA	International Energy Agency	AIE	Agence Internationale de l'Energie	IEA	Internationaal Energieagentschap
ALARO	-	(Atmospheric numerical model are used for making weather forecasts.)	-	(Modèle atmosphérique numérique de prévision du temps)	-	(Atmosferisch numerieke model voor het maken van weersvoorspellingen)
AMICE	AMICE	Adaptation of the Meuse to the Impacts of Climate Evolutions	-	Adaptation de la Meuse aux Impacts des Evolutions du Climat	-	Aanpassing van de Maas aan de invloeden van de klimaatverandering
ANAEE	ANAEE	Infrastructure for Analysis and Experimentation on Ecosystems	-	(Infrastructure pour l'analyse et l'expérimentation des écosystèmes)	-	(Infrastructuur voor analyse en onderzoek van ecosystemen)
APEE's	EEAP	Energy Efficiency Action Plan	PAEE	Plan d'Action Efficacité Energétique	APEE's	Actieplan inzake energie-efficiëntie
APRC	APRC	Annual Percentage Rate of Charge	TAEG	Taux Annuel Effectif Global	RJK	Reëel Jaarlijks Kostenpercentage
AQ/CQ	QA/QC	Quality Assurance / Quality Control	AQ/CQ	Assurance Qualité / Contrôle de Qualité	-	Kwaliteitsborging/ kwaliteitscontrole
AR	-	Royal decree	AR	Arrêté Royal	KB	Koninklijk besluit
AR5	AR5	5th Assessment Report of IPCC	-	Cinquième rapport d'évaluation du GIEC	-	Vijfde assessmentrapport van klimaatpanel van de VN (IPCC)
ARC	-	(concerted research actions)	ARC	Actions de recherche concertées	GOA	Geconcerteerde onderzoekacties
ARISCC	ARISCC	Adaptation of Railway Infrastructure to Climate Change	-	Adaptation de l'infrastructure ferroviaire aux changements climatiques	-	Aanpassing van de spoorweginfrastructuur aan de klimaatverandering
ARTS	ARTS	Accelerating and Rescaling Transitions to Sustainability	-	Accélération et ré-intensification des transitions vers la durabilité	-	De versnelling en intensivering van de transitie naar duurzaamheid
ASBL	NPO	non-profit organisation	ASBL	Association Sans But Lucratif	VZW	vereniging zonder winstoogmerk
ASPI	ASPI	Antarctic Subglacial Processes and Interactions: the role of transition zones in ice sheet stability	-	Processus et interactions sous-glaciaires en Antarctique: rôle des zones de transition dans la stabilité de la calotte glaciaire	ASPI	Antarctische sub-glaciale processen en interacties: rol van transitiezones in ijskapstabiliteit

	EN		FR		NL	
ASTER	ASTER	Assessment of modelling uncertainties in long-term climate and sea- level change projections	-	Evaluation des incertitudes liées aux modèles dans les projections à long terme des changements de climat et du niveau de la mer	-	Bepaling van onzekerheden in modelprojecties van klimaat en het zeeniveau op lange termijn
ATN	-	Benefit in kind	ATN	avantage de toute nature	VAA	Voordelen van alle aard
AWAC	-	Walloon Agency for Air and Climate	AWAC	Agence Wallonne de l'Air et du Climat	-	Waals Agentschap voor Lucht en Klimaat
BAO	-	Brussels Enterprise Agency	ABE	Agence Bruxelloise de l'Entreprise	BAO	Brussels Agentschap voor de onderneming
BAT	BAT	Best Available Technology	MTD	Meilleure technologie disponible	BBT	beste beschikbare technologie/techniek
BAU	BAU	Business as usual	-	Maintien du statu quo	-	Met ongewijzigd beleid
BBP	GDP	Gross domestic product	PIB	Produit Intérieur Brut	BBP	Bruto Binnenlands Product
BBRI	BBRI	Belgian Building Research Institute	CSTC	Centre Scientifique et Technique de la Construction	WTCB	Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf
BBT	BAT	Best Available Technology	MTD	Meilleure Technologie Disponible	BBT	beste beschikbare technologie/techniek
BCR	BCR	Brussels Capital region	RBC	Région de Bruxelles-Capitale	BHG	Brussels Hoofdstedelijk Gewest
BDMA	BDMA	Belgian Direct Marketing Association	-	Association belge du marketing direct	-	Belgische vereniging voor direct marketing
BEI	EIB	European Investment Bank	BEI	Banque Européenne d'Investissement	EIB	Europese Investeringsbank
BELCANTO	BELCANTO	BELgian research on Carbon uptake in the ANTarctic Ocean - Integrated Study of Southern Ocean Biogeochemistry and Climate Interactions in the Anthropocene	-	Etude intégrée de la biogéochimie de l'Océan Austral et des interactions climatiques dans l'Anthropocène	-	Geïntegreerde studie van de Zuidelijke Oceaan biogeochemie en klimaatinteracties in het Antropoceen
BELLS	BELLS	Belgian Lightning Location System	-	Système belge de localisation de la foudre	-	Belgisch systeem voor de lokalisatie van bliksem
BELSPO	BELSPO	BELgian Science POlicy	BELSPO	Politique scientifique fédérale	BELSPO	Federaal Wetenschapsbeleid
bep	boe	Barrel of oil equivalent	Bep	Baril d'équivalent-pétrole	-	Vat olie-equivalent
BERA	BERA	Belgian Energy Research Alliance	-	Alliance des centres belges de recherche en énergie	-	Vereniging van Belgische centra voor energieonderzoek
BERD	EBRD	European Bank for Reconstruction and Development	BERD	Banque Européenne pour la Reconstruction et le Développement	EBRD	Europese Bank voor Heropbouw en Ontwikkeling
BFB	-	Public Service for Finance and Budget	AFB	Administration des Finances et du Budget	BFB	Bestuur Financiën en Begroting
BFFS	BFFS	Belgian Fund for Food Security	FBSA	Fonds belge pour la sécurité alimentaire	BFVZ	Belgisch Fonds voor Voedselzekerheid
BFP	FBP	Federal Planning Bureau	BFP	Bureau Fédéral du Plan	FPB	Federaal Planbureau
BFVZ	BFFS	Belgian Fund for Food Security	FBSA	Fonds belge pour la sécurité alimentaire	BFVZ	Belgisch Fonds voor Voedselzekerheid

	EN		FR		NL	
BHG	BCR	Brussels Capital region	RBC	Région de Bruxelles-Capitale	BHG	Brussels Hoofdstedelijk Gewest
BIGSOUTH	BIGSOUTH	BIoGeochemical cycles in the SOUTHern Ocean: Role within the Earth System	-	Cycles Biogéochimiques dans l'Océan Austral: Rôle au sein du "Système Terre"	-	Biogeochemische cycli in de Zuidelijke Oceaan: Rol in het systeem Aarde
BIM	IBGE-BIM	Brussels Environment	IBGE	Institut Bruxellois pour la Gestion de l'Environnement (Bruxelles Environnement)	BIM	Brussels Instituut voor Milieubeheer (Leefmilieu Brussel)
BIO	-	Belgian Investment Company for Developing Countries	-	Société belge d'Investissement pour les pays en Développement	BIO	Belgische Investeringsmaatschappij voor Ontwikkeling
BIOSOA	BIOSOA	Biogenic Influences on Oxidants and Secondary Organic Aerosol: theoretical, laboratory and modelling investigations	-	Influences biogéniques sur les oxydants et l'Aérosol Secondaire Organique: études théoriques, de laboratoire et de modélisation	-	Biogene Invloeden op Oxidanten en Secundair Organisch Aerosol: theoretisch, laboratorium- en modelleringsonderzoek
BIOSOL	BIOSOL	Formation mechanisms, marker compounds, and source apportionment for BIOgenic atmospheric aeroSOLs	-	Mécanismes de formation, composés marqueurs et attribution des sources des aeroSOLs atmosphériques d'origine BIOgène	-	Vormingsmechanismen, merkerverbindingen en brontoewijzing voor BIOgene atmosferische aëroSOLen
BIRA	BISA	Belgian Institute for Space Aeronomy	IASB	Institut d'Aéronomie Spatiale de Belgique	BIRA	Belgisch Instituut voor Ruimte-aeronomie
BISA	BISA	Belgian Institute for Space Aeronomy	IASB	Institut d'Aéronomie Spatiale de Belgique	BIRA	Belgisch Instituut voor Ruimte-aeronomie
BKG	GHG	Greenhouse gas	GES	Gaz à Effet de Serre	BKG	broeikasgassen
BLAST	BLAST	Bringing Land and Sea Together	-	Réunir Terre et Mer	-	Land en Zee Samenbrengen
BNB	NBB	National Bank of Belgium	BNB	Banque Nationale de Belgique	NBB	Nationale Bank van België
BNI	GNI	Gross national income	RNB	Revenu National Brut	BNI	Bruto nationaal inkomen
BOAD	WADB	West African Development Bank	BOAD	Banque Ouest-Africaine de Développement	-	West-Afrikaanse Ontwikkelingsbank
boe	boe	Barrel of oil equivalent	Bep	Baril d'équivalent-pétrole	-	Vat olie-equivalent
BOF	-	Special Research Fund	-	Fonds Spéciaux pour la Recherche	BOF	Bijzonder Onderzoekfonds
BRAIN-BE	BRAIN-BE	Belgian Research Action through Interdisciplanary Network	-	(Action de recherche belge via des réseaux interdisciplinaires)	-	(Belgische onderzoeksactie via interdisciplinaire netwerken)
BROH	-	Public Service for Housing and Spatial Planning	AATL	Administration de l'Aménagement du Territoire et du Logement	BROH	Bestuur Ruimtelijke Ordening en Huisvesting
BRUGEL	-	Society distributing gaz and electricity in the Brussels-Capital region	BRUGEL	BRUxelles Gaz ELectricité	BRUGEL	BRUssel Gas ELektriciteit
BTC	BTC	Belgian Development Agency	CTB	Agence belge de Développement	BTC	Belgisch Ontwikkelingsagentschap
BTW	VAT	Value added tax	TVA	Taxe sur la Valeur Ajoutée	BTW	belasting op de toegevoegde waarde
BUV	-	Brussels Mobility	AED	Administration de l'Equipement et des Déplacements (Bruxelles mobilité)	BUV	Bestuur Uitrusting en Vervoer (Mobiel Brussel)

	EN		FR		NL	
CAP	CAP	Common Agricultural Policy	PAC	Politique Agricole Commune	GLB	Gemeenschappelijk Landbouwbeleid
CARBO-Extreme	CARBO-Extreme	Comprehensive Modelling of the Earth system for better climate prediction and projection	-	Modélisation globale du système Terre pour la prévision et projection du climat	-	Alomvattende modellering van het systeem aarde voor betere klimaatvoorspellingen en -projecties
CATF	LUCF	Land Use Change and Forestry	CATF	Changement d'Affectation des Terres et Foresterie	-	Verandering van landgebruik en bosbouw
CB	CB	Capacity building	-	Renforcement des capacités	-	Capaciteitsopbouw
CBO's	CBO's	community based organisations	-	Organisations communautaires	-	Gemeenschap-gebaseerde organisaties
CC	CC	Climate Change	CC	Changements Climatiques	-	Klimaatverandering
CCAFS	CCAFS	Climate Change, Agriculture and Food Security	-	Changements Climatiques, agriculture et sécurité alimentaire	-	Klimaatverandering, Landbouw en Voedselveiligheid
CcASPAR	CcASPAR	Climate change and changes in spatial structures research project (in Flanders)	-	Projet (flamand) de recherche sur les changements climatiques et l'aménagement du territoire	-	Onderzoeksproject naar klimaatverandering en veranderingen in ruimtelijke structuren
CCGN	CCGT	Combined-cycle gas power plant	CCGN	Centrale à Cycle Combiné au Gaz naturel	STEG	Stoom- en gascentrale
CCGT	CCGT	Combined-cycle gas power plant	CCGN	Centrale à Cycle Combiné au Gaz naturel	STEG	Stoom- en gascentrale
CCI-HYDR	CCI-HYDR	Climate change impact on hydrological extremes along rivers and urban drainage systems in Belgium	-	Incidences des changements climatiques sur les événements extrêmes dans les rivières et les installations de collecte des eaux usées	-	Impact van klimaatverandering op hydrologische extremen langs rivieren en in rioleringen
CCIM	CCIEP	Coordination Committee for International Environmental Policy	CCPIE	Comité de Coordination de la Politique Internationale de l'Environnement	CCIM	Coördinatiecomité Internationaal Milieubeleid
CCNUCC	UNFCCC	United Nations Framework Convention on Climate Change	CCNUCC	Convention-Cadre des Nations Unies sur les Changements Climatiques	-	Raamverdrag van de Verenigde Naties inzake Klimaatverandering
CCPIE	CCIEP	Coordination Committee for International Environmental Policy	CCPIE	Comité de Coordination de la Politique Internationale de l'Environnement	CCIM	Coördinatiecomité Internationaal Milieubeleid
CCR	JRC	Joint Research Centre (of the European Commission)	CCR	Centre Commun de Recherche (de la Commission Européenne)	GOC	Gemeenschappelijk Onderzoekscentrum (van de Europese Commissie)
CDCF	CDCF	Community Development Carbon Fund	-	Fonds "Carbone" de Développement Communautaire	-	"Koolstoffonds" voor communautaire ontwikkeling
CDM	CDM	Clean Development Mechanism	MDP	Mécanisme pour un Développement Propre	-	Mechanisme voor schone ontwikkeling
CE	EC	European Commission	CE	Commission européenne	EC	Europese Commissie
CELINE	-	Belgian Interregional Cell for the Environment	CELINE	Cellule interrégionale de l'Environnement	IRCEL	Intergewestelijke cel voor het leefmilieu
CER	CER	Certified Emission Reduction	URCE	Unités de Réduction Certifiées des Emissions	-	gecertificeerde emissiereductie

	EN		FR		NL	
CET	-	waste landfill	CET	Centre d'Enfouissement Technique	-	Afvalstort
CGIAR	CGIAR	Consultative Group on International Agricultural Research	-	Groupe consultatif pour la recherche agricole internationale	-	Adviesgroep Internationaal Landbouwonderzoek
CH_4	CH_4	Methane	CH_4	méthane	CH_4	methaan
CHP	CHP	Combined Heat and Power	PCCE	Production Combinée de Chaleur et d'Electricité (cogénération)	WKK	Warmtekrachtkoppeling
CIAT	-	International Center for tropical Agriculture	CIAT	Centre International pour l'agriculture Tropicale	-	Internationaal Centrum voor Tropische Landbouw
CIE	ICE	Interministerial Conference for the Environment	CIE	Conférence Interministérielle de l'Environnement	ICL	Interministeriële Conferentie voor het Leefmilieu
CIFFUL	-	Interdisciplinary Training Centre for Instructors of the University of Liège	CIFFUL	Centre Interdisciplinaire de Formation de Formateurs de l'Université de Liège	-	Interdisciplinair vormingscentrum voor de opleiders van de Universiteit van Luik
CIMPS	IMCSP	Interministerial Conference on Science Policy	CIMPS	Conférence InterMinistérielle de la Politique Scientifique	IMCWB	Interministeriële Conferentie voor Wetenschapsbeleid
CIP	-	International Potato Centre	CIP	Centre international de la pomme de terre	-	Internationaal centrum voor de aardappel
CIP	CIP	Competitiveness and Innovation Framework Programme	-	programme pour la Compétitivité et l'Innovation	-	Competitiviteits- en innovatieprogramma
CIS	ICC	International Cooperation Commission	-	Commission « Coopération internationale »	CIS	Commissie Internationale Samenwerking
CITL	CITL	Community Independent Transaction Log	-	journal des transactions communautaire indépendant	-	onafhankelijk transactielogboek van de Gemeenschap
CIUF	-	Interuniversity Council of the French Community	CIUF	Conseil Interuniversitaire de la Communauté Française	-	Interuniversitaire Raad van de Franse Gemeenschap
CLANIMAE	CLANIMAE	Climate and anthropic impact on African ecosystems	-	Impacts climatiques et anthropiques sur les écosystèmes africains	-	Antropogene en klimatologische impacts op de Afrikaanse ecosystemen
CLiC	CLiC	Climate and Cryosphere	-	Climat et cryosphère	-	Klimaat en cryosfeer
CLIVAR	CLIVAR	Climate Variability and Predictability	-	(Variabilité du climat et prédictibilité)	-	(Klimaatvariabiliteit en voorspelbaarheid)
CLM	CLM	ClimateLimited-areaModelling	-	modélisation du climat à l'échelle locale	-	lokale klimaatmodellering
CNC	NCC	National Climate Commission	CNC	Commission Nationale Climat	NKC	Nationale Klimaatcommissie
CNG	CNG	Compressed Natural Gas	GNC	gaz naturel comprimé	-	Aardgas onder druk
CO	CO	carbon monoxide	CO	Monoxyde de carbone	CO	koolmonoxide
CO_2	CO_2	carbon dioxide	CO_2	Dioxyde de carbone	CO_2	koolstofdioxide

	EN		FR		NL	
COMBINE	COMBINE	Comprehensive Modeling of the Earth system for better climate prediction and projection	-	(modélisation globale du climat pour de meilleures prédictions et projections)	-	(alomvattende modelering van het klimaat voor betere voorspellingen en projecties)
CONCERE	-	Concertation between the federal state and the regions about energy	CONCERE	CONCertation Etat-Régions pour l'Energie	ENOVER	ENergie OVERleg Staat-Gewesten
COP	COP	Conference Of the Parties	COP	COnférence des Parties	COP	Conferentie van de Partijen
COST	COST	European Cooperation in Science and Technology	-	Coopération Européenne en Science et Technologies	-	Europese samenwerking op het vlak van wetenschap en technologie
COV	VOCs	Volatile Organic compounds	COV	Composés Organiques Volatiles	VOS	Vluchtige organische stoffen
CPAS	-	Public center of social welfare	CPAS	Centre Public d'Action Sociale	OCMW	Openbaar Centrum voor Maatschappelijk Welzijn
CPDT	-	Standing Conference on Territorial Development	CPDT	Conférence Permanente du Développement Territorial	-	Permanente Conferentie voor Ruimtelijke Ontwikkeling
CRA	CRA	Concerted Research Actions	ARC	Actions de recherche concertées	GOA	Geconcerteerde onderzoekacties
CREG	CREG	Commission of Regulation of Electricity and Gas	CREG	Commission de Régulation de l'Électricité et du Gaz	CREG	Commissie voor de Regulering van de Elektriciteit en het Gas
CRF	CRF	Common reporting format	-	Format de rapport commun	-	Formaat voor gemeenschappelijke rapportering
CRIE	-	Regional center for ecology initiation	CRIE	Centre Régional d'Initiation à l'Ecologie	GCIE	gewestelijke centra voor ecologie-initiatie
CSEUR	CSEUR	Consolidated System of EUropean Registries	-	système consolidé de registres européens	-	geconsolideerd systeem van Europese registers
CSTC	BBRI	Belgian Building Research Institute	CSTC	Centre Scientifique et Technique de la Construction	WTCB	Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf
CTB	BTC	Belgian Development Agency	CTB	Agence belge de Développement	BTC	Belgisch Ontwikkelingsagentschap
CV	GC	green certificate	CV	Certificat Vert	GSC	Groenestroomcertificaten
CWATUP	-	Walloon Code of Town and Country Planning, Urban Development and Heritage	CWATUP	Code Wallon de l'Aménagement du Territoire, de l'Urbanisme et du Patrimoine	-	Waalse Wetboek van Ruimtelijke Ordening, Stedenbouw en Patrimonium
DAC-EPOC	DAC-EPOC	Development Assistance Committee and the Environment Policy Committee	-	Comité d'aide au développement et comité des politiques d'environnement	-	Ontwikkelingshulpcomité en Comité voor Milieubeleid
DARE	DARE	Data Rescue	-	Récupération de données	-	Recuperatie van gegevens
DD	DD	Degree-days	DJ	Degrés-Jours	-	Graaddagen
DD	SD	Sustainable Development	DD	Développement durable	DO	Duurzame Ontwikkeling
DES	DES	Data exchange standards	-	Normes d'échange de données	-	Normen voor de uitwisseling van gegevens
DG	-	Directorate-general	DG	Direction Générale	DG	Directoraat-generaal

	EN		FR		NL	
DGARNE	-	Directorate-general of the Agriculture, Natural Resources and Environment	DGARNE	Direction Générale Opérationnelle de l'Agriculture, des Ressources Naturelles et de l'Environnement	-	Directoraat-Generaal Landbouw, Natuurlijke hulpbronnen en Leefmilieu
DGD	DGD	Directorate General Development Cooperation and Humanitarian Aid	DGD	Direction Générale Coopération au développement et Aide humanitaire	DGD	Directie-generaal Ontwikkelingssamenwerking en Humanitaire Hulp
DGE	DGE	Directorate-general for European Affairs and Coordination	DGE	Direction Générale Coordination et Affaires européennes	DGE	Directie-Generaal Europese Zaken en Coördinatie
DGSIE	-	Statistics Belgium	DGSIE	Direction Générale Statistique et Information Economique	ADSEI	Algemene Directie Statistiek en Economische Informatie
DJ	DD	Degree-days	DJ	Degrés-Jours	-	Graaddagen
DLR	-	German Aerospace Center	-	Centre aérospatial allemand	-	Duits ruimtevaartcentrum
DMP	DMP	Dry Matter Productivity	-	Productivité de Matière Sèche	-	Productiviteit van droge materie
DNA	DNA	Designated National Authority	-	Autorité nationale désignée	-	Aangewezen nationale autoriteit
DO	SD	Sustainable Development	DD	Développement durable	DO	Duurzame Ontwikkeling
DRC	DRC	Democratic Republic of the Congo	RDC	République Démocratique du Congo	DRC	Democratische Republiek Congo
DUWOBO	-	Transition Arena for Sustainable Living and Building	-	Réseau de transition « vivre et construire de façon durable »	DUWOBO	Transitienetwerk Duurzaam Bouwen en Wonen
EBRD	EBRD	European Bank for Reconstruction and Development	BERD	Banque Européenne pour la Reconstruction et le Développement	EBRD	Europese Bank voor Heropbouw en Ontwikkeling
EC	EC	European Commission	CE	Commission européenne	EC	Europese Commissie
ECBCS	ECBCS	Energy Conservation in Buildings and Community Systems	-	Conservation de l'énergie dans les bâtiments et les systèmes collectifs	-	Energiebehoud in gebouwen en in gemeenschappelijke systemen
ECDC	ECDC	European Centre for Disease prevention and control	-	Centre européen de prévention et de contrôle des maladies	-	Europees centrum voor ziektepreventie en -controle
ECERC	ECERC	Energy Conservation and Emissions Reduction in Combustion	-	Conservation de l'énergie et réduction des émissions dans la combustion	-	Energiebehoud en verlaging van de uitstoot in verbranding
ECORISK	ECORISK	A decision support tool to manage climate change risks to forest ecosystems	-	Outil d'aide à la gestion des écosystèmes forestiers soumis aux risques liés aux changements climatiques	-	Een beleidsondersteunend beslissingssysteem voor het beheer van de risico's van klimaatveranderingen voor bosecosystemen
EDF	EDF	European Development Fund	FED	Fonds Européen de Développement	EOF	Europees Ontwikkelingsfonds
EEA	EEA	European Environment Agency	AEE	Agence européenne de l'environnement	-	Europees Milieuagentschap
EEAP	EEAP	Energy Efficacy Action Plan	PAEE	Plan d'Action Efficacité Energétique	APEE's	actieplan inzake energie-efficiëntie

	EN		FR		NL	
EEDI	EEDI	Energy Efficiency Design Index	-	Indice de Conception d'Efficacité Energétique	-	Index voor energie-efficiëntieontwerp
EERA	EERA	European Energy Research Alliance	-	alliance européenne de recherche dans le domaine de l'énergie	-	Europese alliantie voor energieonderzoek
EEZ	EEZ	Economic and ecologic zone	ZEE	Zone économique et écologique	EEZ	Economische en Ecologische Zone
EG	EC	European Commission	CE	Commission européenne	EC	Europese Commissie
EIB	EIB	European Investment Bank	BEI	Banque Européenne d'Investissement	EIB	Europese Investeringsbank
EIT	EIT	European Institute of Innovation and Technology	-	Institut européen d'innovation et de technologie	-	Europees Instituut voor Innovatie en Technologie
EI-TAF	EI-TAF	Extractive Industries-Technical Advisory Facility	-	Centre de conseils techniques aux industries extractives	-	Technisch adviescentrum voor extractieve industrieën
EMBRACE	-	http://www.embrace-project.eu/index.php/8-news/130-embrace-ipccar5	-	http://www.embrace-project.eu/index.php/8-news/130-embrace-ipccar5	-	http://www.embrace-project.eu/index.php/8-news/130-embrace-ipccar5
EMIS	-	Information system for energy and environment	-	Système d'information pour l'énergie et l'environnement	EMIS	Energie- en milieu-informatiesysteem
ENES	ENES	European Network for Earth System Modelling	-	Réseau européen pour la modélisation du système Terre	-	Europees Netwerk voor het modelleren van het aardsysteem
ENOVER	-	Concertation between the federal state and the regions about energy	CONCERE	CONCertation Etat-Régions pour l'Energie	ENOVER	ENergie OVERleg Staat-Gewesten
EOF	EDF	European Development Fund	FED	Fonds Européen de Développement	EOF	Europees Ontwikkelingsfonds
EOR-net	ERA-NET	European Research Area Network	-	Réseau de l'Espace Européen de la Recherche	EOR-net	Netwerk van de Europese onderzoeksruimte
EPB	EPB	Energy performance of buildings	PEB	Performance Energétique des Bâtiments	EPB	Energieprestaties en binnenklimaat van gebouwen
EPM	EPM	Energy/Emissions Projection Model	-	Modèle de projection de l'énergie et des émissions	-	Model voor de projectie van energie en uitstoot
ERA-NET	ERA-NET	European Research Area Network	-	Réseau de l'Espace Européen de la Recherche	EOR-net	Netwerk van de Europese onderzoeksruimte
ErE	-	Environmental education	ErE	Education relative à l'Environnement	NME	Natuur- en Milieueducatie
ERU	ERU	Emission Reduction Unit	URE	Unité de Réduction des Emissions	-	Emissiereductie-eenheid
ESA	ESA	European Space Agency	ESA	Agence Spatiale Européenne	-	Europees Ruimteagentschap
ESFRI	ESFRI	European Strategic Forum on Research Infrastructures	-	Forum pour la Stratégie Européenne en matière d'Infrastructures de Recherche	-	Europees strategisch forum met betrekking tot onderzoeksinfrastructuren
ESNII	ESNII	European Sustainable Nuclear Industrial Initiative	-	initiative industrielle européenne pour une énergie nucléaire durable	-	Europees industrieel initiatief voor duurzame nucleaire energie

	EN		FR		NL	
ESSEM	ESSEM	Earth System Science and Environmental Management	-	Science du système terrestre et gestion de l'environnement	-	Wetenschap van het aardsysteem en milieubeheer
ETC	ETC	Ecosystem Thematic Center	-	Centre thématique de l'écosystème	-	Thematisch centrum van het ecosysteem
ETS	ETS	Emission Trading Scheme	SEQE	Système d'échanges de quotas d'émission	-	Emissiehandelssysteem
ETSAP-IEA	ETSAP-IEA	Energy Technology Systems Analysis Programme of the International Energy Agency	-	Programme d'analyse de système technologique sur l'énergie de l'Agence Internationale de l'Energie	-	Analyseprogramma voor energietechnologie-systemen van het Internationaal Energie-agentschap
EU	EU	European Union	UE	Union Européenne	EU	Europese Unie
EUA	EUA	European Union Allowances	-	quotas d'émission européens	-	Europese emissierechten
EUREKA	-	intergovernmental organisation for market-driven industrial R&D	-	Organisation intergouvernementale européenne chargée de soutenir les activités de R&D proches du marché	-	Intergouvernementele organisatie voor markt-gestuurde industriële O&O
EURO-AGRIWAT	EURO-AGRIWAT	Assessment of EUROpean AGRIculture WATer use and trade under climate change	-	Évaluation de l'utilisation et du commerce européens de l'eau pour l'agriculture sous les changements climatiques	-	Evaluatie van het gebruik van en handel in water in de Europese landbouw
EUROCLIVAR	EUROCLIVAR	European research on global climate variability and predictability (contribution to the global CLIVAR programme)	-	Recherche européenne sur la variabilité et la prévisibilité du climat mondial (contribution au programme mondial CLIVAR)	-	Europees onderzoek naar de variabiliteit en voorspelbaarheid van het wereldklimaat (bijdrage tot het wereldwijd CLIVAR-programma)
EU-SILC	EU-SILC	European Union Statistics on Income and Living Conditions	-	statistiques de l'UE sur les revenus et les conditions de vie	-	Statistieken van de Europese Unie over inkomens en levensomstandigheden
EWI	-	Economy, Science and Innovation Department	-	Département Economie, Sciences et Innovation	EWI	Departement Economie, Wetenschap en Innovatie
FACCE	FACCE	Agriculture, Food Security and Climate Change	-	Agriculture, sécurité alimentaire et changement climatique	-	Landbouw, Voedselveiligheid en Klimaatverandering
FAO	FAO	Food and Agriculture Organization (of the United Nations)	-	Organisation des Nations Unies pour l'alimentation et l'agriculture	-	Voedsel- en Landbouworganisatie van de Verenigde Naties
fAPAR	fAPAR	fraction of absorbed photosynthetically active radiation	-	Partie du rayonnement photosynthétiquement actif absorbé par la végétation	-	Fractie van de invallende fotosynthetische actieve straling die door de vegetatie geabsorbeerd wordt
FBP	FBP	Federal Planning Bureau	BFP	Bureau Fédéral du Plan	FPB	Federaal Planbureau
FBSA	BFFS	Belgian Fund for Food Security	FBSA	Fonds belge pour la sécurité alimentaire	BFVZ	Belgisch Fonds voor Voedselzekerheid
FCH	FCH	Fuel Cell and Hydrogen	-	Pile à combustible et hydrogène	-	waterstof en brandstofcellen

	EN		FR		NL	
FEBIAC	-	Belgian federation of the Cycle and Motor-car industry	FEBIAC	Fédération belge de l'Automobile et du Cycle	FEBIAC	Belgische automobiel- en tweewielerfederatie
FED	EDF	European Development Fund	FED	Fonds Européen de Développement	EOF	Europees Ontwikkelingsfonds
FED	FED	Federal Government	FED	Gouvernement fédéral	FED	Federale regering
FEDESCO	FEDESCO	Federal Energy Services Company	FEDESCO	Société publique de Services Energétiques	FEDESCO	Publieke Energy Services Company
FEM	GEF	Global Environment Facility	FEM	Fonds pour l'Environnement Mondial	-	(Wereldwijd Leefmilieu Fonds)
FIDA	IFAD	International Fund for Agricultural Development	FIDA	Fonds International de Développement Agricole	-	Internationaal Fonds voor Landbouwontwikkeling
FIRST	-	programme to provide training and impetus for scientific and technical research	FIRST	Formation et Impulsion à la Recherche scientifique et technologique	-	Vorming en impuls voor wetenschappelijk en technologisch onderzoek
FLOODMOIST	FLOODMOIST	Flood mapping and soil moisture retrieval for improved water management	-	Cartographie des inondations et estimation de l'humidité du sol pour une meilleure gestion de l'eau	-	Overstromingskartering en bodemvochtbepaling voor een verbeterd waterbeheer
FloodResilien City	FloodResilien City	EU-funded project which enables responsible public authorities in eight cities in North West Europe to better cope with floods in urban areas	-	projet financé par l'UE qui permet aux pouvoirs publics responsables de huit villes de l'Europe du Nord-Ouest de mieux s'attaquer aux problèmes des inondations dans les zones urbaines	-	EU-gefinancierd project waarbinnen de verantwoordelijke publieke autoriteiten in acht steden van Noordwest-Europa beter kunnen leren omgaan met het gevaar van overstromingen in de stedelijke gebieden
FLW	-	Walloon housing fund	FLW	Fonds du Logement Wallon	-	Waals woningfonds
FOD	FPS	Federal Public Service	SPF	Service Public Fédéral	FOD	Federale Overheidsdienst
FOD BZ	-	Federal Public Service Foreign Affairs, Foreign Trade and. Development Cooperation	SPF AE	Service Public Fédéral Affaires étrangères, Commerce extérieur et Coopération au développement	FOD BZ	Federale Overheidsdienst Buitenlandse Zaken, Buitenlandse Handel en Ontwikkelingssamenwerking
FONL	-	Research education in industry and agriculture	FRIA	Fonds pour la formation à la Recherche dans l'Industrie et dans l'Agriculture	-	Fonds voor opleiding tot het onderzoek in nijverheid en landbouw
FOREM	-	Walloon public service of work and professional education	FOREM	Service public wallon de l'emploi et de la formation professionnelle	-	Waalse overheidsdienst voor beroepsopleiding en arbeidsbemiddeling
FP	FP	Focal Point	-	Point focal	-	Aanspreekpunt
FPB	FBP	Federal Planning Bureau	BFP	Bureau Fédéral du Plan	FPB	Federaal Planbureau
FPS	FPS	Federal Public Service	SPF	Service Public Fédéral	FOD	Federale Overheidsdienst
FR	FR	Flemish region	RF	Région flamande	VG	Vlaams Gewest
FRCE	-	Fund for the reduction of the overall cost of energy	FRCE	Fonds de Réduction du Coût global de l'Energie	FRGE	Fonds ter Reductie van de Globale Energiekost

	EN		FR		NL	
FRFC	-	Fund for Collective Fundamental Scientific Research	FRFC	Fonds de la Recherche Fondamentale Collective	-	Fonds voor collectief fundamenteel wetenschappelijk onderzoek
FRGE	-	Fund for the reduction of the overall cost of energy	FRCE	Fonds de réduction du coût global de l'énergie	FRGE	Fonds ter Reductie van de Globale Energiekost
FRIA	-	Research education in industry and agriculture	FRIA	Fonds pour la formation à la Recherche dans l'Industrie et dans l'Agriculture	-	Fonds voor opleiding tot het onderzoek in nijverheid en landbouw
FRS-FNRS	-	(National) Fund for Scientific Research	FRS- FNRS	Fonds (National) de la Recherche Scientifique	-	(Nationaal) Fonds voor Wetenschappelijk Onderzoek
FRSM	-	Fund for Medical Scientific Research	FRSM	Fonds de la Recherche Scientifique Médicale	-	Fonds voor medisch-wetenschappelijk onderzoek
FSC	FSC	Forest Stewardship Council	-	Conseil de bonne gestion forestière	-	Raad voor duurzaam bosbeheer
FSCC	SCCF	Special Climate Change Fund	FSCC	Fonds spécial pour les changements climatiques	-	Speciaal Fonds voor Klimaatverandering
FTIR	FTIR	Fourier-Transform InfraRed spectro(photo) metry	IRTF	Spectro(photo)métrie InfraRouge à Transformée de Fourier	FTIR	Fourier-transformatie infrarood spectro(foto)-metrie
FUST	FUST	The Flanders UNESCO Science Trust Fund	-	Fonds de dépôt UNESCO-Flandre pour les sciences	-	Vlaams Trustfonds ter ondersteuning van wetenschappelijke activiteiten van de UNESCO
FWO	-	Fund for Scientific Research Flanders	-	Fonds pour la recherche Scientifique en Flandre	FWO	Fonds voor Wetenschappelijk Onderzoek - Vlaanderen
GASEPOC	GASEPOC	Chemical Gas Sensors for Biogas Pollution Control	-	Capteurs chimiques de gaz pour le contrôle de la pollution par le biogaz	-	Chemische gassensoren voor de controle op de vervuiling door biogassen
GC	GC	green certificate	CV	Certificat Vert	GSC	Groenestroomcertificaten
GCIE	-	Regional centre of ecology initiation	CRIE	Centre Régional d'Initiation à l'Ecologie	GCIE	Gewestelijke centra voor natuur- en milieu-initiatie
GCOS	GCOS	Global climate observation system	SMOC	Système Mondial d'Observation du Climat	-	Globaal klimaatobservatiesysteem
GDP	GDP	Gross domestic product	PIB	Produit Intérieur Brut	BBP	Bruto Binnenlands Product
GEF	GEF	Global Environment Facility	FEM	Fonds pour l'Environnement Mondial	-	(Wereldwijd Leefmilieu Fonds)
GEN	-	Suburban network	RER	Réseau Express Régional	GEN	Gewestelijk Expresnet
GERB	GERB	Geostationary Earth Radiation Budget	-	Bilan radiatif géostationnaire de la Terre	-	Geostationaire energiebalans van de aarde
GES	GHG	Greenhouse gas	GES	Gaz à effet de serre	BKG	Broeikasgassen
GHG	GHG	Greenhouse gas	GES	Gaz à effet de serre	BKG	Broeikasgassen
GIEC	IPCC	Intergovernmental Panel on Climate Change	GIEC	Groupe d'experts Intergouvernemental sur l'Evolution du Climat	-	Klimaatpanel van de VN

	EN		FR		NL	
GIS	GIS	Green investment schemes	-	(Système d'investissement environnemental)	-	Groene investeringsfondsen
GISER	-	Integrated Management Soil-Erosion Runoff	GISER	Gestion Intégrée Sol-Erosion-Ruissellement	-	Geïntegreerd beheer Bodem-Erosie-Afvloeiing
GIZ	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	-	Société allemande pour la coopération internationale	-	Duitse maatschappij voor internationale coöperatie
GLB	CAP	Common Agricultural Policy	PAC	Politique Agricole Commune	GLB	Gemeenschappelijk Landbouwbeleid
GMES	GMES	Global Monitoring for Environment and Security	-	Surveillance mondiale pour l'environnement et la sécurité	-	Europees programma voor wereldwijde monitoring voor milieu en veiligheid
GNC	CNG	Compressed Natural Gaz	GNC	gaz naturel comprimé	-	Aardgas onder druk
GNI	GNI	Gross national income	RNB	Revenu National Brut	BNI	Bruto nationaal inkomen
GNSS4SWEC	GNSS4SWEC	Global Navigation Satellite Systems for monitoring severe weather events and climate	-	Système mondial de navigation par satellite pour la surveillance des phénomènes météorologiques violents et du climat	-	Wereldwijd satellietnavigatiesysteem voor de monitoring van extreme weersomstandigheden en van het klimaat
GNT-R	GNT-R	Global Terrestrial Network – River Discharge	-	Réseau mondial terrestre – décharge des rivières	-	Wereldwijd terrestrisch netwerk – afzetting van rivieren
GOA	CRA	Concerted Research Actions	ARC	Actions de recherche concertées	GOA	Geconcerteerde onderzoekacties
GOC	JRC	Joint Research Centre (of the European Commission)	CCR	Centre Commun de Recherche (de la Commission Européenne)	GOC	Gemeenschappelijk Onderzoekscentrum (van de Europese Commissie)
GORE	GORE	Regional Government (Gobierno Regional – Peru)	-	Gouvernement régional (Pérou)	-	Gewestelijke regering (Peru)
GOS	GOS	Global Observing System	-	Système mondial d'observation	-	Wereldwijd observatiesysteem
GPL	LPG	liquefied petroleum gas	GPL	Gaz de Pétrole Liquéfié	-	vloeibaar petroleumgas
GroWaDRrisk	GroWaDRrisk	Drought-related vulnerability and risk assessment of groundwater resources in Belgium	-	Evaluation de la vulnérabilité et du risque liés à la sécheresse des ressources en eaux souterraines en Belgique.	GroWaDRrisk	Droogte-gerelateerde kwetsbaarheid- en risico-analyse van grondwater in België
GSC	GC	green certificate	CV	Certificat Vert	GSC	Groenestroomcertificaten
GSN	GSN	GCOS Surface Network	-	réseau de surface du SMOC	-	GCOS Oppervlaktenetwerk
GT	WG	Working group	GT	Groupe de Travail	WG	Werkgroep
GTZ	GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit	-	Société allemande pour la coopération technique	-	Duitse maatschappij voor technische coöperatie
GWP	GWP	Global Warming Potential	PRG	Potentiel de Réchauffement Global	-	Vermogen tot opwarming van de aarde
HDD	HDD	Heating degree days	DJ	Degrés-Jours	-	Graaddagen

	EN		FR		NL	
HEB	RES	Renewable Energy Source	SER	Sources d'Energie Renouvelables	HEB	hernieuwbare energiebronnen
HF	HF	hydrogen fluoride	HF	fluorure d'hydrogène	HF	waterstoffluoride
HFC	HFC	hydrofluorocarbon	HFC	hydrofluorocarbone	HFK	hydrofluorkoolstof
HFK	HFC	hydrofluorocarbon	HFC	hydrofluorocarbone	HFK	hydrofluorkoolstof
HICP	HICP	harmonised indices of consumer prices	IPCH	Indice des prix à la consommation harmonisé	HICP	Geharmoniseerde Consumptieprijsindex
HOLANT	HOLANT	Holocene climate variability and ecosystem change in coastal East and Maritime Antarctica	-	La variabilité climatique et les changements des écosystèmes de l'Antarctique oriental et maritime à l'Holocène	-	Holocene klimaatvariabiliteit en ecosysteemveranderingen in de kustzone van Oost- en Maritiem Antarctica
IA	IA	Implementing Agreements	-	Accords de mise en œuvre	-	uitvoeringsovereenkomst
IASB	BISA	Belgian Institute for Space Aeronomy	IASB	Institut d'Aéronomie Spatiale de Belgique	BIRA	Belgisch Instituut voor Ruimte-aeronomie
IBGE	IBGE-BIM	Brussels Environment	IBGE	Institut Bruxellois pour la Gestion de l'Environnement	BIM	Brussels Instituut voor Milieubeheer
IBOOT	IBOOT	Impact of Biogenic emissions on Organic aerosols and Oxidants in the Troposphere	-	Impact des émissions biogéniques sur les aérosols organiques et les oxydants dans la troposphère	-	Impact van Biogene emissies op Organische aerosolen en Oxidantia in de Troposfeer
ICAO	ICAO	International Civil Aviation Organization	OACI	Organisation de l'aviation civile internationale	-	Internationale Organisatie voor Burgerluchtvaart
ICARDA	ICARDA	International Centre for Agricultural Research in the Dry Areas	-	Centre international de recherche agricole dans les zones arides	-	Internationaal centrum voor landbouwonderzoek in aride gebieden
ICC	ICC	International Cooperation Commission	-	Commission « Coopération internationale »	CIS	Commissie Internationale Samenwerking
ICE	ICE	Interministerial Conference for the Environment	CIE	Conférence interministérielle pour l'environnement	ICL	Interministeriële conferentie voor het leefmilieu
ICE2SEA	ICE2SEA	Estimating the future contribution of continental ice to sea-level rise	-	estimation de la contribution future de la glace continentale à l'élévation du niveau des mers	-	Schatting van de toekomstige bijdrage van landijs tot de stijging van de zeespiegel
ICL	ICE	Interministerial Conference for the Environment	CIE	Conférence Interministérielle de l'Environnement	ICL	Interministeriële conferentie voor het leefmilieu
iCLIPS	iCLIPS	Constraining long-term climate and sea-level projections using the Last Interglacial	-	Contraindre les projections à long terme du climat et du niveau des mers sur base de la dernière période interglaciaire	-	Beperken van onzekerheden in lange termijn klimaat- en zeeniveauprojecties op basis van het Laatste Interglaciaal
ICN	NAI	National Accounts Institute	ICN	Institut des Comptes Nationaux	INR	Instituut voor de Nationale Rekeningen
ICOS	ICOS	Integrated Carbon Observatory System	-	système intégré d'observation du Carbone	-	geïntegreerd koolstofwaarnemingssysteem
ICP	ICP	Indicative Cooperation Programme	PIC	Programme Indicatif de Coopération	ISP	Indicatief SamenwerkingsProgramma

	EN		FR		NL	
ICRAF	-	World Agroforestry Centre	ICRAF	Centre international pour la recherche en agroforesterie	-	International centrum voor agrobosbouw
ICRISAT	ICRISAT	International Crops Research Institute for the Semi-Arid Tropics	-	Institut international de recherche sur les cultures pour les tropiques semi-arides	-	Internationaal onderzoeksinstituut voor landbouwgewassen in semi-aride tropen
ICU	UHI	urban heat island	ICU	Îlot de chaleur urbain	-	hitte-eilandeffect
IEA	IEA	International Energy Agency	AIE	Agence Internationale de l'Energie	IEA	Internationaal Energieagentschap
IEP	-	Institute of eco-learning	IEP	Institut d'EcoPédagogie	-	Instituut voor milieupedagogie
IEPF	-	Institute of energy and environment	IEPF	Institut de l'énergie et de l'environnement de la Francophonie	-	Instituut voor energie en leefmilieu van de Francofonie
IET	IET	International Emissions Trading	-	Echanges internationaux de droits d'émissions	-	Internationale emissiehandel
IFAD	IFAD	International Fund for Agricultural Development	FIDA	Fonds International de Développement Agricole	-	Internationaal Fonds voor Landbouwontwikkeling
IFDD	-	Francophone Institute for Sustainable Development	IFDD	Institut de la Francophonie pour le Développement Durable	-	Instituut van de francofonie voor duurzame ontwikkeling
IGBP	IGBP	International Geosphere and -Biosphere-Programme	PIGB	Programme International Géosphère-Biosphère	IGBP	Internationaal Geosfeer-Biosfeer-Programma
IHO	-	institutions of higher education	-	établissements d'enseignement supérieur	IHO	instellingen voor hoger onderwijs
IHP	IHP	International Hydrological Programme	PIH	Programme International en Hydrologie	IHP	Internationaal Hydrologisch Programma
IIKW	IISN-IIKW	Interuniversitary Institute of Nuclear Sciences	IISN	Institut Interuniversitaire des Sciences Nucléaires	IIKW	Interuniversitair Instituut voor Kernwetenschappen
IITA	IITA	International Institute of Tropical Agriculture	-	Institut international d'agriculture tropicale	-	Internationaal instituut voor tropische landbouw
IISN	IISN-IIKW	Interuniversitary Institute of Nuclear Sciences	IISN	Institut Interuniversitaire des Sciences Nucléaires	IIKW	Interuniversitair Instituut voor Kernwetenschappen
IISN-IIKW	IISN-IIKW	Interuniversitary Institute of Nuclear Sciences	IISN	Institut Interuniversitaire des Sciences Nucléaires	IIKW	Interuniversitair Instituut voor Kernwetenschappen
ILVO	-	Institute for Agricultural and Fisheries Research	-	Institut de Recherche de l'Agriculture et de la Pêche	ILVO	Instituut voor Landbouw en Visserijonderzoek
IMCSP	IMCSP	Interministerial Conference on Science Policy	CIMPS	Conférence InterMinistérielle de la Politique Scientifique	IMCWB	Interministeriële Conferentie voor Wetenschapsbeleid
IMCWB	IMCSP	Interministerial Conference on Science Policy	CIMPS	Conférence InterMinistérielle de la Politique Scientifique	IMCWB	Interministeriële Conferentie voor Wetenschapsbeleid

	EN		FR		NL	
IMEC	-	Interuniversity microelectronics centre	-	Centre Interuniversitaire de Micro-Electronique et Composants	IMEC	Interuniversitair Micro-Elektronica Centrum
IMO	IMO	International Maritime Organization	OMI	Organisation maritime internationale	IMO	Internationale Maritieme Organisatie
INBO	-	Research Institute for Nature and Forest	-	Institut de Recherche sur la Nature et les Forêts	INBO	Instituut voor Natuur- en Bosonderzoek
INNOVIRIS	INNOVIRIS	Brussels Institute for Research and Innovation	INNOVIRIS	Institut d'encouragement de la Recherche Scientifique et de l'Innovation de Bruxelles	INNOVIRIS	Brussels Instituut voor Onderzoek en Innovatie
INR	NAI	National Accounts Institute	ICN	Institut des Comptes Nationaux	INR	Instituut voor de Nationale Rekeningen
INRA	-	National Institute for Agricultural Research (in France)	INRA	Institut National de la Recherche Agronomique	-	Nationaal Instituut voor Landbouwkundig Onderzoek
ION	-	public interest bodies	OIP	Organismes d'Intérêt Public	ION	Instellingen van Openbaar Nut
IPCC	IPCC	Intergovernmental Panel on Climate Change	GIEC	Groupe d'experts Intergouvernemental sur l'Evolution du Climat	-	Klimaatpanel van de VN
IPCH	HICP	harmonised indices of consumer prices	IPCH	Indice des prix à la consommation harmonisé	HICP	Geharmoniseerde Consumptieprijsindex
IPF	IPF	International Polar Foundation	-	Fondation polaire internationale	-	Internationale Poolstichting
IRCEL	-	Belgian Interregional Cell for the Environment	CELINE	Cellule interrégionale de l'Environnement	IRCEL	Intergewestelijke cel voor het leefmilieu
IRM	RMI	Royal Meteorological Institute	IRM	Institut Royal Météorologique	KMI	Koninklijk Meteorologisch Instituut
IRScNB	-	Royal Belgian Institute of Natural Sciences	IRScNB	Institut Royal des Sciences Naturelles de Belgique	KBIN	Koninklijk Belgisch Instituut voor Natuurwetenschappen
IRTF	FTIR	Fourier-Transform InfraRed spectro(photo) metry	IRTF	Spectro(photo)métrie InfraRouge à Transformée de Fourier	FTIR	Fourier-Transformatie Infrarood Spectro(foto)metrie
ISABU	-	Institute of Agricultural Sciences of Burundi	ISABU	Institut des Sciences Agronomiques du Burundi	-	Burundees Instituut voor Landbouwwetenschappen
ISESCO	ISESCO	Islamic Educational, Scientific and Cultural Organization	-	Organisation islamique pour l'Education, les Sciences et la Culture	-	Islamitische organisatie voor educatie, wetenschap en cultuur
ISF	LAI	Leaf area Index	ISF	Indice de Surface Foliaire	-	Bladoppervlak-index
ISP	ICP	Indicative Cooperation Programme	PIC	Programme Indicatif de Coopération	ISP	Indicatief SamenwerkingsProgramma
ISRIB	ISRIB	Institute for the encouragement of Scientific Research and Innovation of Brussels	IRSIB	Institut d'encouragement de la Recherche Scientifique et de l'Innovation de Bruxelles	IWOIB	Instituut ter bevordering van het Wetenschappelijk Onderzoek en de Innovatie van Brussel
ISSeP	-	Scientific Institute of Public Service	ISSeP	Institut Scientifique de SErvice Public	-	Wetenschappelijk Instituut van de overheid
ITL	ITL	International transaction log	-	Journal des transactions internationales	-	Internationaal transactielogboek

	EN		FR		NL	
IWT	-	Agency for Innovation by Science and Technology	-	Agence pour l'innovation par la science et la technologie	IWT	Agentschap Innovatie door Wetenschap en Technologie
JeROM	-	Youth, Space, Surroundings and Environment	-	Jeunesse, Espace et Environnement	JeROM	Jeugd, Ruimte, Omgeving en Milieu
JI	JI	Joint Implementation	MOC	Mise en Œuvre Conjointe	-	Gezamenlijke uitvoering
JP	JP	Joint Program	-	Programme conjoint	-	Gezamenlijk programma
JPI's	JPI's	Joint programming initiatives	-	Initiatives de programmation conjointe	-	Gezamenlijke programmeringsinitiatieven
JPI-CLIK-EU	JPI-CLIK-EU	Joint Programming Initiative Connecting Climate Change Knowledge for Europe	-	Initiative de programmation conjointe : connexion des connaissances sur les changements climatiques pour l'Europe	-	Gezamenlijk programmeringsinitiatief dat de kennis over klimaatverandering voor Europa samenbrengt
JRC	JRC	Joint Research Centre (of the European Commission)	CCR	Centre Commun de Recherche (de la Commission Européenne)	-	Gezamenlijk onderzoekscentrum (van de Europese Commissie)
KACCAL	KACCAL	Kenya Adapting to Climate Change in Arid and Semi-Arid Lands	-	Adaptation au changement climatique dans les zones arides et semi-arides au Kenya	-	Aanpassing van Kenya aan de klimaatverandering in aride en semi-aride gebieden
KB	-	Royal decree	AR	Arrêté Royal	KB	Koninklijk besluit
KBIN	-	Royal Belgian Institute of Natural Sciences	IRScNB	Institut Royal des Sciences Naturelles de Belgique	KBIN	Koninklijk Belgisch Instituut voor Natuurwetenschappen
KIC	KIC	Knowledge and Innovation Center	-	Centre du savoir et de l'innovation	-	Centrum voor kennis en innovatie
KLIMOS	-	Research Platform Climate Change and Development Cooperation	-	Plate-forme de recherche sur le changement climatique et la coopération au développement	KLIMOS	Onderzoeksplatform Klimaatverandering en Ontwikkelingssamenwerking
KMI	RMI	Royal Meteorological Institute	IRM	Institut Royal Météorologique	KMI	Koninklijk Meteorologisch Instituut
KMMA	RMCA	Royal Museum for Central Africa	MRAC	Musée Royal d'Afrique Centrale	KMMA	Koninklijk Museum voor Midden-Afrika
KMO	SME	small and medium-sized enterprises	PME	Petites et Moyennes Entreprises	KMO	Kleine en Middelgrote Ondernemingen
KOMOSIE	-	dome of environmental entrepreneurs in the social economy	-	Coupole des entrepreneurs environnementaux dans l'économie sociale	KOMOSIE	koepel van milieuondernemers in de sociale economie
KP	KP	Kyoto Protocol	PK	Protocole de Kyoto	PK	Protocol van Kyoto
KSB	-	Royal Observatory of Belgium	ORB	Observatoire Royal de Belgique	KSB	Koninklijke Sterrenwacht van België
KULeuven	-	Catholic university of Leuven	-	Université Catholique de Leuven (Louvain)	KUL	Katholieke Universiteit Leuven
kWh	kWh	kiloWatthour	kWh	kiloWattheure	kWh	kiloWattuur
LAI	LAI	Leaf area Index	ISF	Indice de Surface Foliaire	-	Bladoppervlak index
LCA	LCA	Life-Cycle Assessment	ACV	Analyse du cycle de vie	LCA	Levenscyclusanalyse

	EN		FR		NL	
lCER	lCER	Long term certified emission reduction	URCE-LT	Unités de Réduction Certifiées des Emissions de long terme	-	langetermijn-CER's
LDC	LDC	Least Developed Countries	PMA	Pays les Moins Avancés	MOL	Minst Ontwikkelde Landen
LDCF	LDCF	Least Developed Countries Fund	-	Fonds pour les Pays les Moins Avancés	-	Fonds voor de Minst Ontwikkelde Landen
LNE	-	Environment, Nature and Energy	-	Environnement, Nature et Energie	LNE	Leefmilieu, Natuur en Energie
LPG	LPG	liquefied petroleum gas	GPL	Gaz de Pétrole Liquéfié	-	vloeibaar petroleumgas
LUCF	LUCF	Land Use Change and Forestry	CATF	Changement d'Affectation des Terres et Foresterie	-	Verandering van landgebruik en bosbouw
LULUCF	LULUCF	Land Use, Land-Use Change end Forestry	UTCATF	Utilisation des Terres, Changement d'Affectation des Terres et Foresterie	-	Landgebruik, verandering in landgebruik en bosbouw
LV	-	Agriculture and Fishery Department	-	Département de l'agriculture et de la pêche	LV	Landbouw en Visserij
MACCBET	MACCBET	Modelling atmospheric composition and climate for the Belgian territory	-	Modélisation de la composition atmosphérique et du climat pour le territoire belge	-	De modellering van de samenstelling van de atmosfeer en het klimaat in België
MACSUR	MACSUR	Modelling European Agriculture with Climate Change for food Security	-	Modélisation de l'impact des changements climatiques sur l'agriculture européenne pour la sécurité alimentaire	-	Modellering van de impact van klimaatverandering op de Europese landbouw voor de voedselveiligheid
MAE	-	Agri-environmental measures	MAE	mesures agri-environnementales	-	Agromilieumaatregelen
MARPOL	MARPOL	International Convention for the Prevention of Pollution from Ships	-	Convention internationale pour la prévention de la pollution par les navires	-	Internationaal Verdrag ter voorkoming van verontreiniging door schepen
MASC	MASC	Modelling and Assessing Surface Change impacts on Belgian and Western European climate	-	Modélisation et évaluation des impacts du changement de surface sur le climat belge et européen de l'Ouest	-	Modellering en evaluatie van de impact van oppervlaktewijzigingen op het Belgisch en West-Europees klimaat
MDG	MDG	Millennium Development Goals	OMD	Objectifs du Millénaire pour le Développement	-	Millenniumdoelstellingen
MDP	CDM	Clean Development Mechanism	MDP	Mécanisme pour un Développement Propre	-	Mechanisme voor schone ontwikkeling
MEH	-	Energy House	MEH	Maison de l'énergie – Energie Huis	MEH	Maison de l'énergie – Energie Huis
MER	EIA	Environmental Impact Assessment	-	Rapport d'impact sur l'environnement	MER	Milieueffectrapportage
MERINOVA	MERINOVA	Meteorological risks as drivers of environmental innovation in agro-ecosystem management	-	Les risques météorologiques comme moteurs d'innovation environnementale dans la gestion des agro-écosystèmes	MERINOVA	Meteorologische risico's als drijfveer voor milieukundige innovatie in agro-ecosysteembeheer
METAGE	METAGE	Modelling Ecosystem TrAce Gas Emissions (research program)	-	Programme de recherche "Modelling Ecosystem TrAce Gas Emissions"	-	Onderzoeksprogramma "Modelling Ecosystem TrAce Gas Emissions"
MINAM	-	Peruvian Ministry of the Environment	-	Ministère de l'environnement du Pérou	-	Ministerie voor Leefmilieu in Peru

	EN		FR		NL	
MIP	-	Environmental and Energy Technology Innovation Platform	-	plate-forme pour l'innovation et la technologie en matière d'environnement et d'énergie	MIP	Milieu- en energietechnologie-innovatieplatform
MIRA	-	Environmental report Flanders	-	rapport environnemental flamand	MIRA	Milieurapport Vlaanderen
MIVB	-	Public Transport Company of Brussels	STIB	Société des Transports Intercommunaux de Bruxelles	MIVB	Maatschappij voor het Intercommunaal Vervoer in Brussel
MOC	JI	Joint Implementation	MOC	Mise en Œuvre Conjointe	-	Gezamenlijke uitvoering
MODIRISK	MODIRISK	Mosquito vectors of disease: spatial biodiversity, drivers of change, and risk	-	Moustiques, vecteurs de maladies: biodiversité spatiale, facteurs de changement et risques	-	Muggen, overdragers van ziekten: spatiale bio-diversiteit, factoren die verandering sturen en risico.
MOL	LDC	Least Developed Countries	PMA	Pays les Moins Avancés	MOL	Minst Ontwikkelde Landen
MOP	MOP	Meeting Of the Parties	-	Réunion des parties	-	Meeting van de Partijen
MOS	-	Environmental protection at school	-	protection de l'environnement à l'école	MOS	Milieuzorg op school
MOW	-	Mobility and Public Works Department	-	Département Mobilité et Travaux publics	MOW	Mobiliteit en Openbare Werken
MRAC	RMCA	Royal Museum for Central Africa	MRAC	Musée Royal d'Afrique Centrale	KMMA	Koninklijk Museum voor Midden-Afrika
MRG	MRG	Monitoring and Reporting Guidelines	-	Lignes directrices pour la surveillance et la déclaration (des GES)	-	Richtsnoeren voor de monitoring en rapportage (van BKG)
MTD	BAT	Best Available Technology	MTD	Meilleure Technologie Disponible	BBT	Best Beschikbare Technologie
MTR	MTR	Midterm review	-	Examen à mi-parcours	-	(Tussentijdse evaluatie)
MVO	-	corporate social responsibility	RSE	Responsabilité Sociétale des Entreprises	MVO	maatschappelijk verantwoord ondernemen
MYRRHA	MYRRHA	Multi-purpose hybrid research reactor for high-tech applications	-	Réacteur de recherche hybride multi-usage pour les applications high-tech	-	Multifunctionele hybride onderzoeksreactor voor hoogtechnologische toepassingen
NAI	NAI	National Accounts Institute	ICN	Institut des Comptes Nationaux	INR	Instituut voor de Nationale Rekeningen
NAIADES	-	Navigation and Inland Waterway Action and Development in Europe	NAIADES	programme d'action européen intégré pour le transport par voies navigables	-	Geïntegreerd Europees actieplan voor de binnenvaart
NAMA	NAMA	Nationally Appropriate Mitigation Action	-	Engagements ou initiatives d'atténuation appropriés au niveau national	-	Nationaal geschikte mitigatiemaatregel
NAPA	NAPA	National adaptation programmes of action	PANA	Plan d'Action National d'Adaptation	-	Nationale actieplannen voor adaptatie
NATO	NATO	North Atlantic Treaty Organization	OTAN	Organisation du Traité de l'Atlantique Nord	NAVO	Noord-Atlantische Verdragsorganisatie
NAVO	NATO	North Atlantic Treaty Organization	OTAN	Organisation du Traité de l'Atlantique Nord	NAVO	Noord-Atlantische Verdragsorganisatie
NBB	NBB	National Bank of Belgium	BNB	Banque Nationale de Belgique	NBB	Nationale Bank van België
NCC	NCC	National Climate Commission	CNC	Commission Nationale Climat	NKC	Nationale Klimaatcommissie

	EN		FR		NL	
NCP	NCP	National climate plan	PNC	Plan National Climat	NKP	Nationaal klimaatplan
NCV	NCV	Net calorific value	PCI	Pouvoir Calorifique Inférieur	COW	calorische onderwaarde
NDACC	NDACC	Network for the Detection of Atmospheric Composition Change	-	Réseau pour la détection des modifications de la composition atmosphérique	-	Netwerk voor de waarneming van wijzigingen in de atmosferische samenstelling
NDSC	NDSC	Network for the Detection of Stratospheric Change	-	Réseau pour la détection des changements stratosphériques	-	Netwerk voor de waarneming van stratosferische wijzigingen
NEHAP	NEHAP	National Environmental Health Action Plan	-	Plan national d'action environnement santé	-	Nationaal Actieplan voor Milieu en Gezondheid
NGO	NGO	non-governmental organization	ONG	Organisation Non Gouvernementale	NGO	niet-gouvernementele organisatie
NIR	NIR	National inventory report	RNI	Rapport National d'Inventaire	NIR	Nationaal inventarisatierapport
NOx	NOx	nitrogen oxides	NOx	oxydes d'azote	NOx	stikstofoxiden
N_2O	N_2O	nitrous oxide	N_2O	protoxyde d'azote	N_2O	distikstofmonoxide
NKC	NCC	National Climate Commission	CNC	Commission Nationale Climat	NKC	Nationale Klimaatcommissie
NKP	NCP	National climate plan	PNC	Plan National Climat	NKP	Nationaal klimaatplan
NMBS	-	National Railway Company of Belgium	SNCB	Société Nationale des Chemins de fer Belge	NMBS	Nationale Maatschappij der Belgische Spoorwegen
NME	-	Environmental education	ErE	Education relative à l'Environnement	NME	Natuur- en Milieueducatie
NSSD	NSSD	National Strategy for Sustainable Development	SNDD	Stratégie Nationale de Développement Durable	NSDO	Nationale Strategie Duurzame Ontwikkeling
NSDO	NSSD	National Strategy for Sustainable Development	SNDD	Stratégie Nationale de Développement Durable	NSDO	Nationale Strategie Duurzame Ontwikkeling
NU	UN	United Nations	NU	Nations Unies	VN	Verenigde Naties
NV	Plc	Public company	SA	Société Anonyme	NV	naamloze vennootschap
OACI	ICAO	International Civil Aviation Organization	OACI	Organisation de l'aviation civile internationale	-	Internationale Organisatie voor Burgerluchtvaart
OCDE	OECD	Organisation for Economic Cooperation and Development	OCDE	Organisation de Coopération et de Développement Economiques	OESO	Organisatie voor Economische Samenwerking en Ontwikkeling
OCMW	-	Public Center for Social Welfare	CPAS	Centre Public d'Action Sociale	OCMW	Openbaar Centrum voor Maatschappelijk Welzijn
ODA	ODA	Official Development Assistance	-	Aide officielle au développement	-	officiële ontwikkelingshulp
ODE	-	Organization for sustainable energy	-	Organisation pour l'énergie durable	ODE	Organisatie voor Duurzame Energie
OECD	OECD	Organisation for Economic Cooperation and Development	OCDE	Organisation de Coopération et de Développement Economiques	OESO	Organisatie voor Economische Samenwerking en Ontwikkeling
OESO	OECD	Organisation for Economic Cooperation and Development	OCDE	Organisation de Coopération et de Développement Economiques	OESO	Organisatie voor Economische Samenwerking en Ontwikkeling

	EN		FR		NL	
OHP	-	Haute Provence Observatory	OHP	Observatoire de Haute Provence	-	Observatiecentrum van de Haute Provence
OIP	-	public interest bodies	OIP	Organismes d'Intérêt Public	ION	Instellingen van Openbaar Nut
OL	-	Developing countries	-	Pays en développement	OL	Ontwikkelingslanden
OMI	IMO	International Maritime Organization	OMI	Organisation maritime internationale	IMO	Internationale Maritieme Organisatie
OMD	MDG	Millennium Development Goals	OMD	Objectifs du Millénaire pour le développement	MDG	Millenniumdoelstellingen
OMM	WMO	World Meteorological Organisation	OMM	Organisation météorologique mondiale	WMO	Wereld Meteorologische Organisatie
ONG	NGO	non-governmental organization	ONG	Organisation Non Gouvernementale	NGO	niet-gouvernementele organisatie
O&O	R&D	Research & Development	R&D	Recherche et Développement	O&O	onderzoek en ontwikkeling
OPEC	OPEC	Organization of the Petroleum Exporting Countries	OPEP	Organisation des pays exportateurs de pétrole	-	Organisatie van olie-exporterende landen
OPEP	OPEC	Organization of the Petroleum Exporting Countries	OPEP	Organisation des pays exportateurs de pétrole	-	Organisatie van olie-exporterende landen
ORB	-	Royal Observatory of Belgium	ORB	Observatoire Royal de Belgique	KSB	Koninklijke Sterrenwacht van België
OTAN	NATO	North Atlantic Treaty Organization	OTAN	Organisation du Traité de l'Atlantique Nord	NAVO	Noord-Atlantische Verdragsorganisatie
OVAM	-	Flemish Public Waste Agency	-	Société publique des déchets de la Région flamande	OVAM	Openbare Vlaamse Afvalstoffenmaatschappij
OVW	NCV	Net calorific value	PCI	Pouvoir Calorifique Inférieur	OVW	Onderverbrandingswaarde
OWSF	-	Walloon Observatory of forest health	OWSF	Observatoire wallon de la santé des forêts	-	Waals Observatiecentrum voor de gezondheid van de bossen
PAC	CAP	Common Agricultural Policy	PAC	Politique Agricole Commune	GLB	Gemeenschappelijk Landbouwbeleid
PAE	-	Energy advice procedure	PAE	Procédure d'avis énergétique	-	Procedure voor energie-advies
PAEE	EEAP	Energy Efficacy Action Plan	PAEE	Plan d'Action Efficacité Energétique	APEE	actieplan inzake energie-efficiëntie
PAGES	PAGES	Past Global Changes	-	Etude des changements climatiques passés	-	Studie van de klimaatveranderingen in het verleden
PAMAXEA	PAMAXEA	PAtterns and Mechanisms of climate Extremes in East Africa	-	Modèles et mécanismes des phénomènes climatiques extrêmes en Afrique de l'Est	-	Patronen en mechanismen van extreme klimaatfenomenen in Oost-Afrika
PAMs	PAMs	Policies and measures	-	Politiques et Mesures	-	Beleid en Maatregelen
PANA	NAPA	National adaptation programmes of action	PANA	Plan d'Action National d'Adaptation	-	Nationale actieplannen voor adaptatie
PCCE	CHP	Combined Heat and Power	PCCE	Production combinée de chaleur et d'électricité	WKK	Warmtekrachtkoppeling
PCI	NCV	Net calorific value	PCI	Pouvoir Calorifique Inférieur	COW	Calorische onderwaarde

	EN		FR		NL	
PDE	-	Company mobility plan	PDE	Plans de déplacements d'entreprises	-	bedrijfsvervoerplannen
PDR	-	Rural development plans	PDR	Plans de Développement Rural	PPO	Programma voor plattelandsontwikkeling
PEACE	PEACE	Role of pelagic calcification and export of carbonate production in climate change	-	Rôle de la calcification pélagique et de l'export de la production carbonatée dans les changements climatiques	-	De rol van pelagische calcificatie en export van carbonaatproductie in klimaatverandering
PEB	EPB	Energy performance of buildings	PEB	Performance Energétique des Bâtiments	EPB	Energieprestaties en binnenklimaat van gebouwen
PEFC	PEFC	Programme for the Endorsement of Forest Certification schemes	-	Programme de Reconnaissance des Certifications Forestières (initiative forestière au niveau paneuropéen)	-	pan-Europees boscertificeringsinitiatief
PFC	PFC	Perfluorocarbon	PFC	perfluorocarbone	PFK	Perfluorkoolwaterstof
PFK	PFC	Perfluorocarbon	PFC	perfluorocarbone	PFK	Perfluorkoolwaterstof
PGDA	-	Programme for the Sustainable Management of Nitrogen in Agriculture	PGDA	Programme de Gestion Durable de l'Azote en Agriculture	-	Programma betreffende het Duurzame Beheer van Stikstof in de Landbouw
PHP	PMP/PHP	Passive house platform	PMP	plateforme « Maison Passive »	PHP	Passiefhuis-Platform
PIB	GDP	Gross Domestic Product	PIB	Produit Intérieur Brut	BBP	Bruto Binnenlands Product
PIC	ICP	Indicative Cooperation Programme	PIC	Programme Indicatif de Coopération	ISP	Indicatief SamenwerkingsProgramma
PIE-É	-	Integrated energy centers of excellence	PIE-É	Pôles intégrés d'excellence en énergie	-	Geïntegreerde centra van uitmuntendheid voor energie
PIH	IHP	International Hydrological Programme	PIH	Programme International en Hydrologie	IHP	Internationaal Hydrologisch Programma
PK	KP	Kyoto Protocol	PK	Protocole de Kyoto	PK	Protocol van Kyoto
PLAGE	-	Local Programme of Action for Energy Management	PLAGE	Programme Local d'Actions de Gestion de l'Energie	PLAGE	Plan voor Lokale Actie voor het Gebruik van Energie
PLECO	PLECO	research group of Plant and Vegetation Ecology	-	groupe de recherche sur l'écologie des plantes et des écosystèmes	-	Onderzoeksgroep voor planten- en vegetatie-ecologie
PLUIES	-	Prevention and Fight against Floods and their effects on victims	PLUIES	Prévention et Lutte contre les Inondations et leurs Effets sur les Sinistrés	-	Preventie en strijd tegen overstromingen en hun impact op de slachtoffers
PLURISK	-	Forecasting and management of extreme rainfall induced risks in the urban environment	PLURISK	Prévision et gestion des risques induits par des précipitations extrêmes dans l'environnement urbain	-	Voorspelling en beheer van risico's geïnduceerd door extreme neerslag boven de stedelijke omgeving
PM	PM	Particle matter	-	Particule fine	-	Fijn stof
PMA	LDC	Least Developed Countries	PMA	Pays les Moins Avancés	MOL	Minst Ontwikkelde Landen

	EN		FR		NL	
PME	SME	Small and medium-sized enterprises	PME	Petites et Moyennes Entreprises	KMO	Kleine en Middelgrote Ondernemingen
PMP	PMP/PHP	Passive house platform	PMP	plateforme « Maison Passive »	PHP	Passiefhuis-Platform
PMP/PHP	PMP/PHP	Passive house platform	PMP	plateforme « Maison Passive »	PHP	Passiefhuis-Platform
PMRC	WCRP	World Climate Research Programme	PMRC	Programme Mondial de Recherche sur le Climat	-	Wereldwijd programma voor klimaatonderzoek
PMV	-	Flemish Participation Company	-	agence de financement flamande	PMV	Participatiemaatschappij Vlaanderen
PNC	NCP	National Climate Plan	PNC	Plan National Climat	NKP	Nationaal Klimaatplan
PNUE	UNEP	United Nations' Environment Programme	PNUE	Programme des Nations Unies pour l'Environnement	-	Milieuprogramma van de Verenigde Naties
PoA	PoA	Programme of Activities	-	CDM Programmatique	-	Programmatische CDM
POD	PPS	Federal Public Planning Service	SPP	Service Public Fédéral de Programmation	POD	Programmatorische federale overheidsdienst
ppm	ppm	parts per million	ppm	Partie par million	-	deeltjes per miljoen
PPO	-	rural development plans	PDR	Plans de Développement Rural	PPO	Plannen voor Plattelandsontwikkeling
PPP	PPP	Public Private Partnership	PPP	Partenariat Public-Privé	PPS	Publiek-Private Samenwerking
PPS	PPP	Public Private Partnership	PPP	Partenariat Public-Privé	PPS	Publiek-Private Samenwerking
PPS	PPS	Federal Public Planning Service	SPP	Service Public Fédéral de Programmation	POD	Programmatorische federale overheidsdienst
PREDANTAR	PREDANTAR	Understanding and predicting Antarctic sea ice variability at the decadal timescale	-	Comprendre et prédire la variabilité de la glace de mer à l'échelle décennale	-	Begrip en voorspelling van de variabiliteit van de. Antarctische zee-ijsbedekking op decenniaschaal
PREDISOL	PREDISOL	Characterization of active regions' time evolution in view of solar flare prediction	-	Caractérisation de l'évolution temporelle des régions actives en vue de la prédiction d'éruptions solaires	-	Karakterisering van de tijdsevolutie van actieve regio's voor het voorspellen van zonnevlammen
PRFB	PRFB	Prospective Research for Brussels	-	Recherche prospective pour Bruxelles	-	Prospectieonderzoek voor Brussel
PRG	GWP	Global Warming Potential	PRG	Potentiel de Réchauffement Global	-	vermogen tot opwarming van de aarde
PRI	-	Regional Innovation Plan	PRI	Plan Régional pour l'Innovation	-	Regionaal innovatieplan
QA/QC	QA/QC	Quality Control / Quality Assurance	AQ/CQ	Assurance Qualité / Contrôle de Qualité	-	Kwaliteitsborging/ kwaliteitscontrole
RBC	BCR	Brussels Capital region	RBC	Région de Bruxelles-Capitale	BHG	Brussels Hoofdstedelijk Gewest
Scenarios RCPs	RCPs	Representative Concentration Pathways	Scénarios RCPs	quatre scénarios relatifs à l'évolution de la concentration en gaz à effet de serre au cours du XXIe siècle	RCP-scenario's	Vier scenario's van de evolutie van de concentratie van broeikasgassen in de loop van de 21ste Eeuw
R&D	R&D	Research & Development	R&D	Recherche et Développement	O&O	Onderzoek en Ontwikkeling

	EN		FR		NL	
RDC	DRC	Democratic Republic of the Congo	RDC	République Démocratique du Congo	DRC	Democratische Republiek Congo
REDD-ALERT	REDD-ALERT	Reducing Emissions from Deforestation and Degradation through Alternative Land uses in Rainforests of the Tropics	-	Réduction des émissions liées à la déforestation et à la dégradation par d'autres utilisations des terres dans les forêts pluviales des Tropiques	-	Verlaging van de uitstoot afkomstig van ontbossing en degradatie door alternatieve landgebruiken in tropische regenwouden
REDD+	REDD+	Reducing Emissions from Deforestation and Forest Degradation	REDD+	Réduction des émissions liées à la déforestation et à la dégradation des forêts	-	Verlaging van de uitstoot afkomstig van ontbossing en bosdegradatie
REG	RUE	rational utilisation of energy	URE	Utilisation Rationnelle de l'Energie	REG	rationeel energiegebruik
RELIABLE	-	Intelligent and sustainable electrical networks	RELIABLE	Réseaux ELectriques Intelligents et durABLEs	-	Intelligente en duurzame elektrische netwerken
REMA	REMA	REgistry Management Application	-	Application de gestion de registre	-	Applicatie voor registerbeheer
RER	-	Suburban network	RER	Réseau Express Régional	GEN	Gewestelijk Expresnet
RERD	RERD	Renewable Energy for Rural Development	-	Énergie renouvelable pour le développement rural	-	Hernieuwbare energie voor landelijke ontwikkeling
RES	RES	Renewable Energy Source	SER	Sources d'Energie Renouvelables	HEB	hernieuwbare energiebronnen
RF	FR	Flemish region	RF	Région flamande	VG	Vlaams Gewest
RIB	RIB	Research in Brussels	-	Recherche à Bruxelles	-	Onderzoek in Brussel
RJK	APRC	Annual Percentage Rate of Charge	TAEG	Taux Annuel Effectif Global	RJK	Reëel Jaarlijks Kostenpercentage
RMCA	RMCA	Royal Museum for Central Africa	MRAC	Musée Royal d'Afrique Centrale	KMMA	Koninklijk Museum voor Midden-Afrika
RMI	RMI	Royal Meteorological Institute	IRM	Institut Royal Météorologique	KMI	Koninklijk Meteorologisch Instituut
RMU	RMU	Removal unit	-	Unité supprimée	-	verwijderingseenheid
RNB	GNI	Gross national income	RNB	Revenu National Brut	BNI	Bruto nationaal inkomen
RNI	NIR	National inventory report	RNI	Rapport National d'Inventaire	NIR	Nationaal inventarisatierapport
RoK	RoK	Region of Knowledge	-	Région de connaissance	-	kennisregio
RSE	-	corporate social responsibility	RSE	Responsabilité Sociétale des Entreprises	MVO	maatschappelijk verantwoord ondernemen
RTBF	-	Belgian French-speaking radio and television	RTBF	Radio-Télévision Belge Francophone	-	Belgische Franstalige radio en televisie
RUE	RUE	rational utilisation of energy	URE	Utilisation Rationnelle de l'Energie	REG	rationeel energiegebruik
S3C	S3C	Smart Consumer – Smart Customer – Smart Citizen	-	Consommateur avisé - Client avisé – Citoyen avisé	-	Verstandige Consument – Verstandige Klant - Verstandige Burger
SA	Plc	Public company	SA	Société anonyme	NV	naamloze vennootschap
SAFECOAST	SAFECOAST	Sustainable Coastal Risk Management in 2050	-	Gestion durable du risque côtier en 2050	-	Duurzaam kustrisicobeheer in 2050
SBO	-	Strategic Basic Research Programme	-	Recherche fondamentale stratégique	SBO	Strategisch Basisonderzoeksprogramma

	EN		FR		NL	
SCCF	SCCF	Special Climate Change Fund	FSCC	Fonds spécial pour les changements climatiques	-	Speciaal Fonds voor Klimaatverandering
SCK•CEN	SCK•CEN	Belgian Nuclear Research Center	CEN	Centre d'Etude de l'Energie Nucléaire	SCK	Studiecentrum voor Kernenergie
SCOT	SCOT	Smart CO_2 Transformation	-	Transformation intelligente du CO_2	-	Intelligente CO_2-omzetting
SD	SD	Sustainable Development	DD	Développement durable	DO	Duurzame Ontwikkeling
SEEMP	SEEMP	Ship Energy Efficiency Management Plan	-	Plan de gestion de l'efficacité énergétique des navires	-	Beheersplan voor energie-efficiëntie op schepen
SEF	SEF	Standard electronic format	-	Format électronique standard	-	Standaard elektronisch formaat
SEQE	ETS	Emission Trading Scheme	SEQE	Système d'échanges de quotas d'émission	-	emissiehandelssysteem
SER	RES	Renewable Energy Sources	SER	Sources d'Energie Renouvelables	HEB	hernieuwbare energiebronnen
SET-plan	SET-plan	Strategic Energy Technology Plan	-	Plan stratégique pour les technologies de l'énergie	-	Strategisch plan voor energietechnologieën
SF_6	SF_6	sulphur hexafluoride	SF_6	hexafluorure de soufre	SF_6	zwavelhexafluoride
SHC	SHC	Solar Heating and Cooling	-	chauffage et refroidissement solaire	-	Verwarming en koeling op zonne-energie
SIC-Adapt	SIC-Adapt	Strategic Initiative Cluster - Adaptation to Spatial Impacts of Climate Change	SIC-Adapt	Initiative stratégique de Cluster - adaptation aux impacts du au changement climatique.	SIC-Adapt	Strategisch Initiatief Cluster – Aanpassing aan de invloeden van klimaatverandering
SIE	-	energy information system	SIE	système d'information énergétique	-	Energie-informatiesysteem
SIFÉE	-	International French Secretariat for Environmental Assessment	SIFÉE	Secrétariat International Francophone pour l'Évaluation Environnementale	-	Internationaal Franstalig secretariaat voor milieubeoordeling
SME	SME	Small and medium-sized enterprises	PME	Petites et Moyennes Entreprises	KMO	Kleine en Middelgrote Ondernemingen
SMOC	GCOS	Global climate observation system	SMOC	Système Mondial d'Observation du Climat	-	Globaal klimaatobservatiesysteem
SNCB	-	National Railway Company of Belgium	SNCB	Société Nationale des Chemins de fer Belge	NMBS	Nationale Maatschappij der Belgische Spoorwegen
SNDD	NSSD	National Strategy for Sustainable Development	SNDD	Stratégie Nationale de Développement Durable	-	Nationale Strategie Duurzame Ontwikkeling
SNETP	SNETP	Sustainable Nuclear Energy Technology Platform	-	Plate-forme technologique pour une énergie nucléaire durable	-	Technologisch platform voor duurzame nucleaire energie
SOFICO	-	Walloon company for additional financing of infrastructure	SOFICO	Société wallonne de financement complémentaire des infrastructures	-	Waalse maatschappij voor de aanvullende financiering van de infrastructuren
SOLAS	SOLAS	Surface-Ocean-Lower Atmosphere Study	-	Étude sur la couche troposphérique à la surface de l'océan	-	Studie van de interacties tussen het oceaanoppervlak en de troposfeer
SPARC	SPARC	Stratospheric Processes and their Role in Climate	-	Processus stratosphériques et leur rôle dans le climat	-	Stratosferische processen en hun rol voor het klimaat

	EN		FR		NL	
SPF	FPS	Federal public service	SPF	Service Public Fédéral	FOD	Federale Overheidsdienst
SPF AE	-	Federal Public Service Foreign Affairs, Foreign Trade and Development Cooperation	SPF AE	Service Public Fédéral Affaires étrangères, Commerce extérieur et Coopération au développement	FOD BZ	Federale Overheidsdienst Buitenlandse Zaken, Buitenlandse Handel en Ontwikkelingssamenwerking
SPP	PPS	Federal Public Planning Service	SPP	Service Public Fédéral de Programmation	POD	Programmatorische federale overheidsdienst
SPW	WPS	Walloon public service	SPW	Service Public de Wallonie	-	Waalse Overheidsdienst
SRWT	-	Regional Walloon company for transport	SRWT	Société Régionale Wallonne du Transport	-	Waalse gewestelijke vervoermaatschappij
SSD	SSD	Science for a Sustainable Development	-	Science pour un Développement Durable	WDO	Wetenschap voor een Duurzame Ontwikkeling
SSP	SSP	Single Service Provider	-	Fournisseur de service unique	-	Enkele dienstverlener
STEG	CCGT	Combined Cycle Gas Turbine	CCGN	Centrale à Cycle Combiné au Gaz naturel	STEG	Stoom- en gascentrale
STEP UP	STEP-UP	Strategies Towards Energy Performance and Urban Planning	-	Stratégies vers la performance énergétique et l'urbanisme	-	Strategieën voor energieperformantie en ruimtelijke ordening
STEREO II	STEREO II	(Research Programme for Earth Observation) Support to the Exploitation and Research in Earth Observation data	-	Programme de recherche en Observation de la Terre STEREO II	-	Onderzoeksprogramma voor aardobservatie STEREO II
STI	STI	Science, Technology and Innovation	STI	Science, Technologie et Innovation	-	Wetenschap, technologie en innovatie
STIB	-	Brussels transport company	STIB	Société des Transports Intercommunaux de Bruxelles	MIVB	Maatschappij voor het Intercommunaal Vervoer in Brussel
STOCHLIM	STOCHLIM	Improving the representation and prediction of climate processes through stochastic parameterization schemes	-	Améliorer la description et la prévision des processus climatiques au travers de schémas de paramétrisation stochastique	-	Verbetering van de beschrijving en de voorspelling van klimaatprocessen aan de hand van stochastische parametrisatie-schema's
SUDEMCLL	SUDEMCLL	Impact of Climate Change on River Hydrology and Ecology: A Case Study for Interdisciplinary Policy Oriented Research	-	Impact du changement climatique sur l'écologie et l'hydrologie fluviale: Une étude de cas de la politique de recherche orientée interdisciplinaire	-	Effect van klimaatverandering op rivierhydrologie en ecologie: een gevalstudie voor interdisciplinair beleidsgericht onderzoek
SURFEX	-	surface modelling platform developed by Meteo-France	SURFEX	SURface Externalisée (plateforme de modélisation de surface développée par Météo-France)	-	platform voor oppervlaktemodelvorming ontwikkeld door Météo-France
SWCS	-	Walloon company for social credit	SWCS	Société Wallonne du Crédit Social	-	Waalse maatschappij voor sociaal krediet
SWL	-	Walloon housing company	SWL	Société Wallonne du Logement	-	Waalse woningmaatschappij
SYMBIOSE	-	Flemish project for the exchange of waste amongst firms	-	Projet flamand d'échange de déchets entre entreprises	SYMBIOSE	Vlaams project voor de uitwisseling van afval tussen bedrijven
TAEG	APRC	Annual Percentage Rate of Charge	TAEG	Taux Annuel Effectif Global	RJK	Reëel Jaarlijks Kostenpercentage

	EN		FR		NL	
TBE	TBE	Tick-borne encephalitis	-	Encéphalite à tiques	-	Tekenencefalitis
TCCON	TCCON	Total Carbon Column Observing Network	-	Réseau d'observation de la colonne totale de carbone	-	Netwerk voor observaties van de totale hoeveelheid koolstof
tCER	tCER	Temporary certified emission reduction	URCE-T	Unités de Réduction Certifiées des Emissions temporaire	-	tijdelijke CER's
TEB	TEB	Town Energy Budget	-	Bilan d'énergie urbaine	-	stedelijke energiebalans
TEC	-	Walloon public transport company	TEC	Transport en Commun en Wallonie	-	Waalse vervoermaatschappij
tep	toe	Ton of oil equivalent	Tep	Tonne d'équivalent-pétrole	toe	Ton olie-equivalent
TIDE	TIDE	Tidal River Development	-	Développement des fleuves soumis à la marée	-	Ontwikkeling van getijdenrivieren
toe	toe	Ton of oil equivalent	Tep	Tonne d'équivalent-pétrole	toe	Ton olie-equivalent
TSI	TSI	Total Solar Irradiance	-	Irradiance solaire totale	-	Totale zonnestraling
TT	TT	Technology transfer	TT	Transfert de Technologie	-	Technologieoverdracht
TTC	-	Including all taxes	TTC	Toute taxe comprise	-	Alle taksen inbegrepen
TVA	VAT	value added tax	TVA	Taxe sur la Valeur Ajoutée	BTW	Belasting op de toegevoegde waarde
UCL	-	Catholic university of Louvain-la-Neuve	UCL	Université catholique de Louvain-la-Neuve	-	Katholieke Universiteit in Louvain-la-Neuve
UE	EU	European Union	UE	Union Européenne	EU	Europese Unie
UHI	UHI	urban heat island	ICU	Îlot de chaleur urbain	-	Hitte-eilandeffect
ULB	-	(French-speaking) Free University of Brussels	ULB	Université Libre de Bruxelles	-	(Franstalige) Vrije Universiteit Brussel
UN	UN	United Nations	NU	Nations Unies	VN	Verenigde Naties
UNCBD	UNCBD	United Nations Convention on Biological Diversity	-	Conventions des Nations Unies sur la biodiversité	-	Verdragen van de Verenigde Naties over de biodiversiteit
UNCCD	UNCCD	United Nations Convention to Combat Desertification	-	Conventions des Nations Unies sur la lutte contre la désertification	-	Verdragen van de Verenigde Naties over de strijd tegen de verwoestijning
UNDP	UNDP	United Nations Development Programme	PNUD	Programme des Nations-Unies pour le Développement	-	Ontwikkelingsprogramma van de Verenigde Naties
UNEP	UNEP	United Nations' Environment Programme	PNUE	Programme des Nations Unies pour l'Environnement	-	Milieuprogramma van de Verenigde Naties
UNESCO	UNESCO	United Nations Educational, Scientific and Cultural Organization	-	Organisation des Nations Unies pour l'éducation, la science et la culture	-	Organisatie van de Verenigde Naties voor onderwijs, wetenschap en cultuur

	EN		FR		NL	
UNFCCC	UNFCCC	United Nations Framework Convention on Climate Change	CCNUCC	Convention-Cadre des Nations Unies sur les Changements Climatiques	-	Raamverdrag van de Verenigde Naties inzake Klimaatverandering
UNIDO	UNIDO	United Nations Industrial Development Organization	ONUDI	Organisation des Nations Unies pour le développement industriel	-	Organisatie van de Verenigde Naties voor industriële ontwikkeling
UQA	AAU	assigned amount unit	UQA	Unité de Quantité Attribuée	-	toegewezen emissie-eenheid
URCE	CER	certified emission reduction	URCE	Unités de Réduction Certifiées des Emissions	-	gecertificeerde emissiereductie
URCE-LT	lCER	Long term certified emission reduction	URCE-LT	Unités de Réduction Certifiées des Emissions de long terme	-	langetermijn-CER’s
URCE-T	tCER	Temporary certified emission reduction	URCE-T	Unités de Réduction Certifiées des Emissions temporaire	-	tijdelijke CER’s
URE	RUE	rational utilization of energy	URE	Utilisation Rationnelle de l’Energie	REG	rationeel energiegebruik
URE	ERU	Emission Reduction Unit	URE	Unité de Réduction des Emissions	-	Emissiereductie-eenheid
UREBA	-	Rational Use of Energy in Buildings	UREBA	Utilisation Rationnelle de l'Energie dans les BAtiments	-	Financiering van REG-projecten in gebouwen van het Waals Gewest
US	US	United States	-	Etats-Unis	VS	Verenigde Staten
UTCATF	LULUCF	Land Use, Land-Use Change end Forestry	UTCATF	Utilisation des Terres, Changement d'Affectation des Terres et Foresterie	-	landgebruik, verandering in landgebruik en bosbouw
UV	UV	Ultraviolet	UV	Ultraviolet	UV	Ultraviolet
UWE	-	Walloon union of companies	UWE	Union Wallonne des Entreprises	-	Waals verbond van ondernemingen
VAA	-	Benefit in kind	ATN	avantage de toute nature	VAA	Voordelen van alle aard
VAT	VAT	Value added tax	TVA	Taxe sur la Valeur Ajoutée	BTW	belasting op de toegevoegde waarde
VDAB	-	Flemish Public Employment and vocational training Service	-	Office flamand de l'emploi et de la formation professionnelle	VDAB	Vlaamse Dienst voor Arbeidsbemiddeling en Beroepsopleiding
VEA	-	Flemish Energy Agency	-	Agence flamande de l’énergie	VEA	Vlaams Energieagentschap
VEB	-	Flemish Energy company	-	Société flamande de l’énergie	VEB	Vlaams EnergieBedrijf
VG	FR	Flemish region	RF	Région flamande	VG	Vlaams Gewest
ViA	-	Flanders In Action	-	La Flandre en Action	ViA	Vlaanderen in Actie
VIL	-	Flanders Institute for Logistics	-	Institut flamand de logistique	VIL	Vlaams Instituut voor de Logistiek
VILT	-	Flemish infocenter for agriculture and horticulture	-	Centre d'Information Flamand pour l'Agriculture et l'Horticulture	VILT	Vlaams Infocentrum Land- en Tuinbouw

	EN		FR		NL	
VIM	-	Flanders Institute for Mobility	-	Institut flamand pour la mobilité	VIM	Vlaams Instituut voor Mobiliteit
VIPA	-	Flemish Infrastructure Fund for Person related matters	-	Fonds de l'Infrastructure affectée aux matières personnalisables	VIPA	Vlaams Infrastructuurfonds voor Persoonsgebonden Aangelegenheden
VITO	-	Flemish Institute for Technological Research	-	Institut flamand pour la recherche technologique	VITO	Vlaamse Instelling voor Technologisch Onderzoek
VLAKWA	-	Flanders Knowledge Centre Water	-	Centre de Connaissance Flamand concernant l'eau	VLAKWA	Vlaams Kenniscentrum Water
VLIR	-	Flemish Interuniversity Council	-	Conseil interuniversitaire flamand	VLIR	Vlaamse Interuniversitaire Raad
VLIR-UOS	-	Flemish Interuniversitaire Council - university development cooperation	-	Conseil flamand interuniversitaire - coopération universitaire au développement	VLIR-UOS	Vlaamse Interuniversitaire Raad – universitaire ontwikkelingssamenwerking
VLIZ	-	Flanders Marine Institute	-	Institut flamand de la Mer	VLIZ	Vlaams Instituut voor de Zee
VMDERN	-	Vice-Ministry of strategic development of natural resources	-	Vice-Ministère du développement stratégique des ressources naturelles	VMDERN	vice-ministerie van strategische ontwikkeling van natuurlijke hulpbronnen
VMM	-	Flemish Environment Agency	-	Agence flamande de l'environnement	VMM	Vlaamse Milieumaatschappij
VMP	-	Flemish mitigation plan	-	Plan flamand d'atténuation	VMP	Vlaams Mitigatieplan
VMSW	-	Flemish Social Housing Company	-	Société flamande du Logement social	VMSW	Vlaamse Maatschappij voor Sociaal Wonen
VN	UN	United Nations	NU	Nations Unies	VN	Verenigde Naties
VOC	VOC	Volatile Organic compound	COV	Composé Organique Volatile	VOS	Vluchtige organische stof
VOS	VOC	Volatile Organic compound	COV	Composé Organique Volatile	VOS	Vluchtige organische stof
VPWvO	-	Flemish Partnership Water for Development	-	Partenariat flamand "l'eau pour le développement"	VPWvO	Vlaams Partnerschap Water voor Ontwikkeling
VREG	-	Flemish Electricity and Gas Regulatory Body	-	Autorité de régulation flamande pour le marché de l'électricité et du gaz	VREG	Vlaamse Regulator van de Elektriciteits- en Gasmarkt
VS	US	United States	-	Etats-Unis	VS	Verenigde Staten
VSV	-	Flemish foundation for road safety	-	Fondation flamande pour la sécurité routière	VSV	Vlaamse Stichting Verkeerskunde
VTFM	-	Flanders Mitigation Task Force	-	Task Force flamande sur l'atténuation	VTFM	Vlaamse Task Force Mitigatie
VUB	-	Free University Brussels	-	Université libre néerlandophone de Bruxelles	VUB	Vrije Universiteit Brussel
VZW	NPO	Non-profit organization	ASBL	Association Sans But Lucratif	VZW	vereniging zonder winstoogmerk
WADB	WADB	West African Development Bank	BOAD	Banque Ouest-Africaine de Développement	-	West-Afrikaanse Ontwikkelingsbank

	EN		FR		NL	
WAM	WAM	"With additional measures"	-	"Avec mesures additionnelles"	-	"Met bijkomende maatregelen"
WARDA	WARDA	West Africa Rice Development Association	ADRAO	Association pour le développement de la riziculture en Afrique de l'Ouest	-	Vereniging voor de ontwikkeling van de rijstteelt in West-Afrika
WB	WB	World Bank	-	Banque mondiale	-	Wereldbank
WB	-	Wallonia-Brussels	WB	Wallonie-Bruxelles	-	Wallonië-Brussel
WBI	WBI	Wallonia-Brussels International	WBI	Wallonie-Bruxelles International	-	Wallonië-Brussel Internationaal
WCRP	WCRP	World Climate Research Programme	PMRC	Programme Mondial de Recherche sur le Climat	-	Wereldwijd programma voor klimaatonderzoek
WDO	-	Science for a Sustainable Development	SSD	Science pour un Développement Durable	WDO	Wetenschap voor een Duurzame Ontwikkeling
WEISS	WEISS	Water Emissions Inventory planning Support System	-	Inventaire des sources d'émissions (polluantes) de l'eau - Système d'aide à la planification	WEISS	Water Emissies Informatie Support Systeem
WEM	WM	"With existing measures"	-	"Avec mesures existantes"	-	"Met maatregelen"
WG	WG	Working group	GT	Groupe de Travail	WG	werkgroep
WKK	CHP	combined heat and power	PCCE	Production Combinée de Chaleur et d'Electricité (cogénération)	WKK	Warmtekrachtkoppeling
WMO	WMO	World Meteorological Organisation	OMM	Organisation Météorologique Mondiale	WMO	Wereld Meteorologische Organisatie
WNF/WWF	WWF	World Wide Fund for Nature	-	Fonds mondial pour la nature	WNF/WWF	Wereld Natuur Fonds
WOUDC	WOUDC	World Ozone and Ultraviolet Data Centre	-	Centre Mondial des Données sur l'Ozone et le Rayonnement Ultraviolet	-	Werelddatacentrum voor ozon en ultraviolette straling
WPS	WPS	Walloon public service	SPW	Service Public de Wallonie	-	Waalse overheidsdienst
WR	WR	Walloon region	RW	Région wallonne	WG	Waals Gewest
WSE	-	Work and Social Economy Department	-	Emploi et économie sociale	WSE	Werk en Sociale Economie
WTCB	BBRI	Belgian Building Research Institute	CSTC	Centre Scientifique et Technique de la Construction	WTCB	Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf
WTI	STI	Science, Technology and Innovation	STI	Science, technologie et innovation	WTI	Wetenschap, Technologie en Innovatie
WWF	WWF	World Wide Fund for Nature	-	Fonds mondial pour la nature	WNF/WWF	Wereld Natuur Fonds
ZAWA	ZAWA	Zambian Wildlife Authority	-	Autorité zambienne de la vie sauvage	-	Zambiaanse dienst voor natuurbehoud
ZEE	EEZ	Economic and ecologic zone	ZEE	Zone économique et écologique	EEZ	Economisch en Ecologisch Zone

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