

2.1. Mining

2.1.1. General

The Brussels-Capital Region have no mining activities on its territory, but the two other Regions do. Due to article 6, §1, VI, 5° of the law of the reform of 1980, the authority of the natural resources policy and management are transferred to the Regions.

2.1.2. Mining in the Flemish Region

The subsoil in the Flemish Region is mainly composed of sedimentary deposits of Tertiary and Quaternary formations, and, hence, natural resources are construction minerals like clay, loam, sand and gravel. Since the mining of coal stopped these construction minerals are nowadays the only extracted and commercialised mineral natural resources in the Flemish Region. The construction minerals are essential resources for the economically and socially important sectors of the building and infrastructure industry. Bricks, tiles, *argex* granules, glass, mortar, concrete and glazed stoneware pipes are all fabricated with Flemish surface raw materials. Quartz sand and its derived products like cristobalite, silicon and water glass (sodium silicate) have numerous high-grade applications. They are used as important additives or fillers in paints, detergents, good-quality plasters, paper, toothpaste, automobile tyres, tile cements, transparent plastic films, et cetera. Silicon is also the main base material for the production of semiconductors like chips and solar cells.

The direct employment in the extraction industry counts about 3.500 employees in the Flemish Region. In general, around 152.000 persons work in the Flemish construction industry, which are dependent on a continuous supply of construction minerals.

a) Policy and regulations

FEATURES OF NATIONAL MINING CODES OR MINERAL INDUSTRY CODE

Sustainable development plays an important role in the Flemish mineral planning policy.

The **Decree on Surface Mineral Resources** ('Oppervlakedelfstoffendecreet') of 4 April 2003, followed by the Order of the Flemish Government of 26 March 2004 ('VLAREOP'), determines the Flemish mineral natural resources policy. This legislation sets the base of a **sustainable mineral natural resources management and established the framework for making plans of surface mineral resources** (Algemeen Oppervlakedelfstoffenplan en Bijzondere Oppervlakedelfstoffenplannen).

The global aim of the **Decree on Surface Mineral Resources** is to provide in the need of raw materials on a sustainable matter on behalf of the present and future generations. The Decree addresses the specific needs of the extraction industry and includes its needs in several different areas, like for example (i) plan for land use, (ii) supply and use of mineral natural resources, (iii) restructuring and (iv) environmental aspects. The global aim of creating a sustainable management of mineral resources is further specified into: (1) the extraction has to allow an

improvement of the economical, social and environmental components, (2) the extraction industry must keep a future perspective of further development, (3) mineral resources should not be wasted, (4) the extraction should be optimal within the foreseen extraction sites and with a minimum use of surface area, (5) one should stimulate the use of alternative products, and (6) nature and the natural environment should be maintained and further developed as much as possible.

As a function of the natural composition of the resources, the administration provides a certificate of the origin to guarantee the safe environmental use of the mineral natural resource(s).

The Decree looks also at the use of secondary or alternative materials, and at the rehabilitation at the end of the extraction. The permit holder has to provide a financial guarantee towards the Flemish Government for the site rehabilitation. By the Order of the Flemish Government of 26 March 2004, the various aspects of this decree have been further specified.

The Flemish Region has established the framework for making plans of surface mineral resources ('Oppervlakedelfstoffenplannen') which translate the objectives of the Decree on Surface Mineral Resources. The plans look at the further development over a 25-year period and they contain actions for a period of 5 years. These plans have to be evaluated every five years.

The **General Plan of Surface Mineral Resources** ('Algemeen Oppervlakedelfstoffenplan') was adopted by the Flemish Government on 10 July 2008. The plan reaches out several concepts and indicators of a sustainable extraction policy and analyses the need of raw materials for the next 5 years based on economic studies, marketing research.... It gives an overview of the import and export and the possible use of alternative materials. An important part of the plan is dedicated to the action plan of sustainable extraction and the use of valuable alternatives for the primary raw materials. To assure the supply of raw materials on an economic and environmental sustainable manner in the future it is important that sufficient raw materials can be extracted, because:

- ▶ not for every raw materials are valuable alternatives present;
- ▶ a change to more import of raw materials may not be the cause of a displacement of environmental overburden to other countries;
- ▶ a lot of industrial activities in the Flemish Region are set up due to the specific characteristics of the present raw materials;
- ▶ certain low worthy but important and necessary raw materials can not be transported over long distances due to high costs and environmental impact of the transportation.

Special plans of surface mineral resources ('Bijzondere oppervlakedelfstoffenplannen – BOD') are determined for each geological and/or geographical deduced raw material variety. Based on a realistic, substantiated determination of the demand and taken into account the geological, spatial, ecological, economical en agricultural conditions, new sites of extraction are determined and existing, fully exploited sites are given a new land use destination. These special plans pay particular attention to the environmental impact and the influence on the safety and health of

people due to the extraction. They are also subjected to the legislation of the environmental impact assessment. The implementation of the plans is fulfilled by the regional spatial implementing plans (gewestelijke ruimtelijke uitvoeringsplannen). Until now three special plans are adopted by the Flemish Government:

- ▶ Special plan of Clay of the Kempen (1 December 2006),
- ▶ Special plan of Clay of Ieper and Maldegem (28 November 2008),
- ▶ Special plan of alluvial clay and clay of Polder (20 February 2009).

For the extraction of **gravel** in the Province of Limburg (Flemish Region), the Regional Government had taken a significant initiative. On 14 July 1993, the Gravel Decree was approved, aiming at a systematic reduction towards a total stop of gravel production if a certain predetermined quota is extracted. A fee is charged per tonnage gravel extracted and a fund has been created to manage this money. The yearly extracted amount of gravel has decreased the last decade as shown in the Table and Figure below and the predetermined quota has nearly been reached. A future policy is subsequently determined with the amendment of the Gravel Decree with the Decree of 3 April 2009. This amendment forms the base of a project-based approach. This project-based extraction of gravel will only be allowed on the condition that it provides an improvement of the ecology and biodiversity of the local nature. It has to be evaluated in the future to which extent this project-based gravel extraction shall fill in the demand for gravel in the Flemish Region.

Table: Amount of extracted minerals in the Flemish Region from 1998 until 2007.

Kton	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Gravel	5795	6931	6889	6373	5990	4673	4282	4921	4583	3376
Clay and Loam	3385	2655	3092	2103	2028	2358	2304	2435	2681	2277
Quartz sand	4266	3989	3970	4031	3798	3383	3937	3815	3500	3678
Coarse sand	1488	1351	2274	1752	1577	1361	1388	1350	1277	1352
Sand	3455	4214	3604	1948	2623	1455	996	1267	882	1292
Sand from gravel extraction	2359	2831	2806	2614	2447	1893	1812	1950	1748	1508
TOTAL (kton)	22746	23970	24633	20822	20465	15123	14720	15859	14671	13483

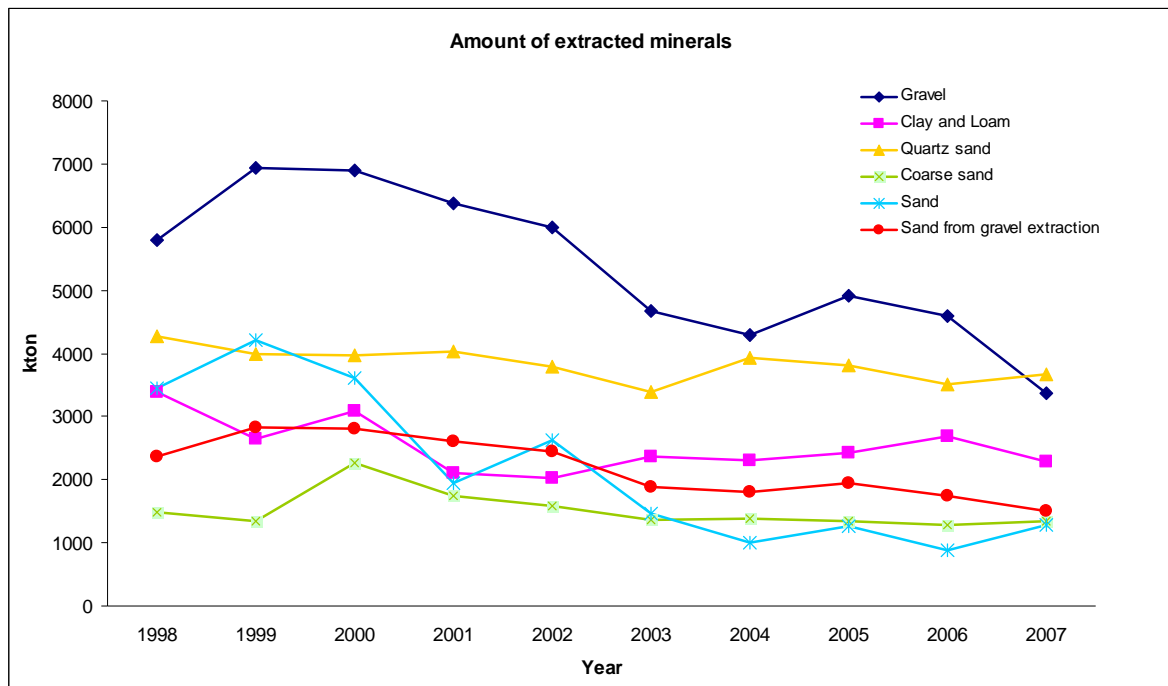


Figure: Amount of extracted minerals (kton) in the Flemish Region from 1998 until 2007.

The policy of the **deep underground** is managed by the Decree of the Flemish Parliament on the deep underground of 8 May 2009. In its first section, the decree of the Flemish Parliament on the deep underground lays down the rules for the exploration and exploitation of hydrocarbons in the deep underground of the Flemish Region. In its second section, the decree provides a regulatory framework for the geological storage of carbon dioxide.

Besides the own legislation concerning natural resources, also other important legislation and decrees have their impact on the natural resources policy.

The Belgian planning systems are based on the 1962 **Spatial Organisation and Town Planning Act** (National Law of 29 March 1962). Basically the spatial organisation is defined in so-called destination plans. A destination plan is a land use plan which determines the allowed use of its territory by precisely indicating the allowed activities in each type of zone. The aim is to improve the spatial quality of our environment. For this law specific extraction locations are indicated on the regional zoning plan. When the extraction stops the site rehabilitation has to be fulfilled precisely as is also indicated on these plans.

Extraction becomes possible if the following two **permits** have been delivered:

- ▶ an environmental permit;
- ▶ a building permit related to the changes of the relief.

The **building permit** regulates the changes of the relief and the deliverance of the permit is determined by the Decree of 18 May 1999 on spatial regulation.

The Decree of 28 June 1985 concerning the **environmental permit** requires that every demand for an environmental permit has to be preceded by a public consultation. This Decree was followed by the Order of the Flemish Government of 23 March 1989 regarding the organisation of an environmental impact assessment for certain categories of disturbing constructions. Article 3.10 determines that quarries, pits, excavations of industrial extraction of sand, gravel, clay, ... with an total extraction surface of more than 10 ha are classified as a construction for which an environmental impact report is required.

With the Flemish regulation on environmental permits (VLAREM) of 6 February 1991 (Order of article 3 of the Decree of 28 June 1985) and the Order of the Flemish Government of 1 June 1995 concerning **global and sectoral terms of environmental protection**, the disturbing constructions in extraction sites have to comply with extensive technical instructions of the VLAREM regulation. The sectoral terms for extraction contain for instance regulations concerning slope stability and the width of the protection strip.

The European **Mining Waste** directive was implemented in the Flemish Regulation on Environmental permits (VLAREM) on 6 June 2008.

REGULATIONS AND MECHANISMS FOR COMPLIANCE AND MONITORING

To guarantee an optimal extraction, the permit holder has to present a progress report to the division authorised for the mineral natural resources every year, as is determined by the Order of the Flemish Government of 26 March 2004. This progress report should contain among others a state of the art of the extraction with a location map, the amount of extracted material, the depth of the extraction and a report with the phasing of the extraction.

The enforcement of the Decree and Order on Surface Mineral Resources has recently been regulated by the Decree on Environmental Enforcement of 30 April 2009. This new decree gives the authorised administration more tools and rights to take accurate action if an environmental violation occurred.

PUBLIC/STAKEHOLDER CONSULTATION AND PARTICIPATION IN DECISION-MAKING RELATED TO MINING

The Decree and Order on Surface Mineral Resources include a public-stakeholder consultation in the planning process. Before final adoption, the special plans of surface mineral resources have to be submitted for public inspection for an evaluation of the proposed extraction sites. This means that public involvement legally is ensured in the planning process at all levels. Ecological, economical, spatial, geological and agricultural considerations are taken into account in the planning process. Public-stakeholder consultations also take place before implementation of these special plans in the regional spatial implementing plans.

Moreover, for every demand for a building permit and an environmental permit a public-stakeholder consultation has to be performed (see Environmental Impact Assessment).

PUBLIC GOVERNANCE AND TRANSPARENCY IN THE MINING SECTOR

Geological knowledge gathering and sharing has to guarantee and improve the innovative policy and valorisation of the mineral natural resources. A database of underground data in the Flemish Region “Databank Ondergrond Vlaanderen (DOV)” is publicly available on the web. This Flanders Soil and Subsoil Database is a cooperation between three entities of the Flemish government, the Land and Soil Protection, Subsoil and Natural Resources Division, the Geotechnics Division and the Operational Water Management Agency. DOV was set up in 1996. The main goal of the Database DOV is to be the overall database compiling and offering soil and subsoil information of Flanders. The amount of maps and point data that can be found in the geographically oriented database is growing continuously. In the beginning of 2008, more than 121.000 drillings, 60.000 cone penetration tests, 32.000 groundwater abstraction licenses, 6.900 filters with 223.000 groundwater level measurements and 40.000 groundwater quality measurements are available. Different (sub)soil maps (e.g. geological map) and overlay maps (isohypses and isopaches) can be consulted as well. These data are available free of charges on <http://dov.vlaanderen.be>. Data are made accessible in different ways: on the one hand DOV exchanges data with other governmental entities through web services, on the other hand the application offers the clients real time data on the web.

b) Mining best practices

A first important step in the strategic planning of **sustainable development** is defining the land use in a destination plan. At that level there is competition with agricultural use, nature areas, housing, etc.

Second, as the mineral natural resources extracted in the Flemish Region are only construction minerals, the sustainable development focuses mainly on valuable alternatives for these minerals and recycling building products to replace e.g. gravel and sand. But however, taking into account these efforts, there will always be a need for primary raw materials. The transition process to a cradle-to-cradle economy cannot result in a nonstop declining need for primary raw materials. New evolutions concerning valuable alternatives can be taken into account in the 5-yearly revision of the special plans of surface mineral resources.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND MONITORING OF ALL PHASES OF MINING OPERATION (EXPLORATION, PROJECT DEVELOPMENT, MINE OPERATION, AND MINE CLOSURE)

The Special Plans of Mineral Resources follow the legislation of the Environmental Impact Assessment Law (Plan-MERdecreet) of 27 April 2007 and the Order of 12 October 2007.

Every demand for an environmental permit has to be preceded by a public consultation (Decree of 28 June 1985). Quarries, pits, excavations of industrial extraction of sand, gravel, clay ... with a total extraction surface of more than 10 ha are classified as a construction for which an environmental impact report is required (Order of the Flemish Government of 23 March 1989).

With the Flemish regulation on environmental permits (VLAREM) the extraction sites have to comply with extensive technical instructions of the VLAREM regulation. The division of Environmental Inspection performs regular verifications on site.

The mine operation is also followed with the yearly published progress reports.

The Decree on Surface Mineral Resources pays also special attention at the site rehabilitation at the end of the extraction. The permit holder has to provide a financial guarantee towards the Flemish Government for the site rehabilitation.

RISK ASSESSMENT OF MINES AND MINING ACTIVITIES

The sectoral terms for slope stability in the quarries and the width of the protection strip around the pit is determined in the Flemish Regulation on Environmental permits (VLAREM).

REHABILITATION OF AFFECTED COMMUNITIES AND LIFE-SUPPORTING ECOSYSTEMS, INCLUDING MINE SITE DECOMMISSIONING

The Gravel Decree (14 July 1993) determines that a fee is charged per tonnage gravel extracted and a fund has been created to manage this money. The aim of the fund is among others to fulfil the rehabilitation of the site, to assist with the social aspects for the people working in the quarries, to study alternatives for gravel, to help in the re-structuring of this branch of the industry, etc.

TECHNOLOGICAL, INSTITUTIONAL AND SOCIAL INITIATIVES FOR PROTECTING THE HEALTH OF MINING WORKERS

As a function of the natural composition of the mineral resources, a certificate of the origin is provided to guarantee the safe environmental use of the mineral natural resource (in conformity with the Decree on Surface Mineral Resources).

MINE CLOSURE PLANNING

The Decree on Surface Mineral Resources (4 April 2003) determines that the permit holder has to provide a financial guarantee towards the Flemish Government for site rehabilitation. This guarantee can be either an insurance, a bank guarantee or a guarantee by a person or by a company. Without such a guarantee, the extraction may not start. The Flemish Government fixes the amount of the guarantee. The Order of 26 March 2004 allows the Minister to fix a price per surface area (m²). The total sum of the guarantee can be variable in time; e.g. if the extraction takes place in successive phases, it increases when the extraction advances; and if part of the rehabilitation is done, it may decrease.

After decommissioning, the land use of the former extraction site has to be fulfilled as is indicated on the regional zoning plans. A special Agricultural Rehabilitation Evaluation Commission has recently been established. This commission has to evaluate if the subsequent agricultural land use has been fulfilled successfully.

2.1.3. Mining in the Walloon Region

The Walloon Region counts some 160 mining sites which produce an amount of almost 70 millions of tons per annum. It plays a very important part in the regional economy, but also generates inconveniences for side residents, as well as environmental pressures. Nuisance must thus be reduced as much as possible. But significant improvements have already been made regarding environmental impacts : investements to meet environmental standards, voluntary commitments, local agreements with authorities. On the other hand, the upgrading of discommitionned mining sites is a central point of the Walloon mining policy.

Wallonia is quite a small territory but with intensive mining activities. Coal mining in the basin Charleroi - Liège has been one of the major features of the Walloon economy for 600 years and especially from the Industrial Revolution until 1984. Since World War II, the Walloon mining industry has been declining, until now. It is due, mainly, to international competition, especially for coal exportations. However, mining is still a very important sector of the Walloon economy as it provides raw materials, mainly for construction. The activity has thus been **recentered around bigger stone quarries** and the level of production is steady. Two main types of rock are worked: **chalk and dolomite** which are used for industrial (cement works, lime...) and civil engineering (gravels, granulat,...). Beside it, some smaller quarries exploit decorative rocks (black marble...) which represent 1,5% of the production.

The sector is not a really significant source of jobs in Wallonia but provides with raw material industries which are strategic with regard to employment: the construction sector, the glass industry. It represents as much as 16000 indirect jobs and mining industry ranks on the 10th position Walloon industrial sectors with a global turnover of 600 millions € per annum.

a) Policy and regulations

Features of national mining codes or mineral industry code

- ▶ **Decree about quarries** (surface ground exploitation) of the 4th of July 2002 modified by the Decree of 31st of May 2008 about the involvement of the public concerning environmental matters. This decree establishes the obligation for mining companies to obtain an environmental permit (*Permis d'environnement*, see below).
- ▶ **Plans de secteur**: the Walloon Region is divided in 23 *Plans de secteur* (Territorial management plans) which were drawn up to regulate land use according to predetermined allocations, specifically to manage building development. They affect, indeed, the mining sector and have a legal standing but may undergo modifications according to governmental initiatives¹. Since 2005, any new zone to be urbanized must be compensated either by a modification going in the other direction, for a similar-sized area not to be urbanised (agricultural, forest, natural, etc.) or by any "alternative compensation defined by the Government".

¹ More information can be found on this page : <http://developpement-territorial.wallonie.be/PDS.html>

- ▶ **Permis d'environnement** (Environmental Permit): the administrative licence necessary before being allowed to start and run a business or an industry². It was established according to the Decree of the 11th of March 1999³ and is delivered if the project complies with territorial management plans and the legislation on waste and water (pumping and disposal) management. An **impact study** is thus always carried out before any permit issue. Furthermore, in order to receive the permit, mining companies must submit anticipatory upgrading project for the mining area they are planning to work. Due to the high traffic of trucks generated by mining activities, obligatory routes can be imposed on trucks by the *Permis d'environnement* in order to reduce nuisance.
- ▶ **Conditions sectorielles** (Sectoral terms): after the obtention of the *Permis d'environnement*, the company still have to comply with a set of criteria wich are related to the specific activities carried out by a given sector⁴. For example, in mining's case, specific regulations exist regarding temporary stocking of used oil and lubricants. These conditions are meant to prevent accidental pollutions. But, more specifically regarding mining, CS also impose noise level limitations according to the localization of the mining site, measures to reduce dust emission, vibrations (due to explosives use level) limitations, etc. The CS were established by the Decree of the 17th July 2003⁵.
- ▶ Implementation of the European directive **Mining Waste** (2006/21/EC) in the *Decree of the 18th of December 2008 about mining industry's waste management* → implies the listing of all mining sites (disused, potential or in activity) and the reporting of their condition and evolution. In addition, the drawing up of individual mining waste management plans is obligatory (other wastes are already treated by the waste management plan imposed by the *Permis d'environnement*.) It is, however, not applied to companies using back-filling technics. The reporting to the European Commission must be done every 5 years.

Regulations and mechanisms for compliance and monitoring

Control duties are taken on by the DPC (Department of Police and Controls) of the DGARNE (General Direction of Agriculture, Natural Ressources and Environment). It is a specialized police corpse with a very high level of expertise as far as pollution is concerned. It has direct and strong means of intervention.

Guidelines for artisanal, small and medium scale mining

As a complement to the Decree of the 17th of July 2003 on sectoral terms for quarries, a **guide presenting good practices** is currently under finalisation. It is designed to help companies to

² List of concerned activities : <http://www.permisenvironnement.be/UWE-Environnement/permis-d'environnement/qui-est-concerne/verifiez-le-classement-de-vos-activites-principales>

³ [http://www.ucm.be/C1256C0D003C8BF5/_/BE69176B9A3BFA41C12574A5004F0731/\\$file/PE%20fiche%20info.pdf?OpenElement](http://www.ucm.be/C1256C0D003C8BF5/_/BE69176B9A3BFA41C12574A5004F0731/$file/PE%20fiche%20info.pdf?OpenElement)

⁴ More information about these conditions :

http://environnement.wallonie.be/cgi/dgrne/aerw/pe/index_condi.htm

⁵ <http://environnement.wallonie.be/LEGIS/pe/pesect036.htm>

implement the articles 22, 23 and 24 of the decree⁶ which are about upgrading and securing of the sites after their exploitation. This guide is designed for all types of mining companies.

Public/Stakeholder consultation and participation in decision-making related to mining

- ▶ For every modification of a *Plan de secteur*, an **impact study** on the whole area concerned must be carried out. Then a project of modification is adopted by the Government and submitted to a public enquiry in concerned areas during 45 days. In the end, the new plan is adopted by the Government.
- ▶ When a company applies for a *Permis d'environnement*, a **support committee** is very often created. It is designed as a dialogue board between the applicant, the authorities and the population of neighbouring areas. It will be active until the term of the permit. It is in charge of stating the practical details of the "bond of trust" bringing the necessary transparency and dialogue between the applicant and the population. It is in charge of measuring the consequences of the mining activity and possible compensations in case of damages. It also communicates the important information to the population (for example when explosives are used for mining).
- ▶ The *CRAEC* (Regional Advice Commission on Quarries Working) is a consultation organ made up of sector, political, side residents and associations of protection of the environment representatives. It provides opinions and recommendations on legislation and regulations about quarries.

b) Mining best practices

Environmental Impact assessment (EIA) and monitoring of all phases of mining operation (exploration, project development, mine operation and mine closure)

- ▶ Before any modification of a *Plan de secteur* or any issue of a new *Permis d'environnement*, an **impact study** must be carried out.
- ▶ **Monitoring:** *Owen* gauges are installed to measure sedimental dust, as well as devices measuring their proportion in suspension. The network of gauges is permanent and their location is determined before the issue of a permit. It is managed by the *ISSeP* (Scientific Institute of the Public Administration). A consequence is a fall-off of 30% of dust emission thanks to the setting up of figured objectives and of new exploitation procedures (rock crushers kept in closed environment, moistening of the production, more efficient filtration systems, etc.). Likewise, *sismic sensors* measure and control vibrations due to the use of explosives in the same conditions. They are meant to monitor the respect of term DIN 4150 about vibrations resulting of the use of explosives of the *Conditions sectorielles*.

Private Public Partnership (PPP) for sustainable mining

- ▶ **Accord de branche** (*Sectorial agreement*): on the 12th of July 2006, several mining companies concluded a sectorial agreement to work together towards a more civic approach and reduce their CO2 emissions by 2012. This agreement was approved and is

⁶ <http://environnement.wallonie.be/LEGIS/pe/pesect036.htm>

supported by the Walloon Government. 10 companies signed the agreement and energy audit were conducted within them. Energy consumption as well as gas emissions were determined. After that, figured objectives were set up: an improvement of 8,6% of energy efficiency and a reduction of 8,8% of gas emissions. These figures were based on the IEE (Index of Energy Efficiency) and the IGES (Index of Green gas Emissions) of the companies (and not on a list of measures). Both indices take into account amounts produced, the global energy consumption and CO₂ emissions, as well as the specific value of a ton of product.

- ▶ **Water seepage** management: in 2003, water seepage volume in mining sites reached 34 millions m³ which represents 8,4% of the total amount of underground water drawn per annum in the Walloon Region. The fact that mining sites are bigger and worked for a longer period implies the increase of water seepage amounts. That is why the Walloon Region (through the SWDE – Walloon Water Society) is going into partnerships with several mining companies to upgrade seepage water and transform it in drinking water. The water is thus pumped⁷ and after sanitation, mixed with water coming from waterworks and distributed. It allows a relief of the pressure put on ground water. These operations are mainly implemented in the Hainaut province (Tournai, Ecaussinnes) where pressures on ground water is especially significant and alarming. The total amount of water distributed coming from mining sites came to 6,7 millions m³ (⁸).

Emergency Response Plans and Preparedness at the local level

Companies are bound to develop emergency plans. According to the seriousness and the characteristics of the incident, different emergency plans can be activated at the local, provincial, regional or federal levels.

Risk assessment of mines and mining activities

Several studies are presently undertaken in the Walloon Region so as to assess the long term environmental impact caused by the shutting down of coal mines and their pumping operations. In many locations, new problems are encountered, such as sudden underground water appearance at hill slopes, coal heaps instability or flooding of underground cellars. Slope instability increases risks. The main goals of the presented studies are to suppress or at least to limit those risks and inconveniences and propose solutions to be implemented in the framework of the existing dewatering facilities built by the Walloon Region and local authorities in mines induced subsidence areas.

⁷ also in natural karst limestone cavities (Tournai)

⁸ A very interesting practice used in Wallonia, and particularly in the area of Liège, is called *Le Démergement* and is worth to be mentioned. It is a technical response to ground settlements due to former mining tunnels on the banks of the river Meuse and resulting floods. The fact is that due to ground settlements, the level of the ground, which was already lower than the one of the river, has still decreased making floods more and more frequent and serious. The solution found relies on two aspects. First, the piping and direct draining in the Meuse river of water from plateaus and hills, thanks to gravity. Secondly, the pumping of rain water, domestic waters and water seepage are collected and pumped towards the Meuse River when it's level is too high to allow a natural flow of the water collected. Further information on <http://www.aide.be/demergement/demergement.html> .

Rehabilitation of affected communities and life-supporting ecosystems, including mining site decommissioning

Nowadays, according to the Decree of the 17th of July 2003, mining sites upgrading is obligatory to avoid the emergence of waste lands and to maximize natural and artificial possibilities of the area. This can be done through maintaining habitat's diversity and substitute biotopes for endangered species, the preservation of noteworthy groups of species, or also the creation of new environments. Indeed, decommissioned mining sites play a very important part in the fight against the lost of biodiversity (for example regarding species like bank swallows or pilgrim hawks). At the moment, on 5000 former mining sites, almost 1250 have been re-colonized by vegetation and 468 are listed as Sites of High Biological Interest. Indeed, they are pioneer places where biodiversity can be boosted (under control of the Walloon environmental administration).

Technological, institutional and social initiatives for protecting the health of mining workers

In concert with the *IFAPME*⁹ (Walloon institute for alternate training of self-employed persons and small and medium scale businesses) and the *Fediex*¹⁰ (Belgian mining industry federation), several thematic trainings are organised for mining companies employees: use of explosives, driving of heavy vehicles, handling of heavy loads, security, etc.

Mine Closure Planning (Land use plans & site rehabilitation, site safety, decommissioning, waste dumps & tailings, site water management, off-site infrastructure, community socio-economic programs and employees)

The upgrading of inactive mining sites already starts when working of the site starts. It means that during the working phase, the management of the site and mining activities must include the planning of the final upgraded decommissioned site. For example, overburden must be used for the upgrading of the area. (see above)

⁹ <http://www.ifapme.be/>

¹⁰ <http://www.fediex.be/>