Objectives:

- 27.5 TWh of end-user energy savings in 2016
- 12% share of renewables for electricity suppliers in 2012

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*2008 and 2000-2008 for steel

++ Among best countries  + Better than the EU average  - Below the EU average  -- Among countries with lowest performances

Latest update: January 2011

1 The European Union, as the best-performing region, is used as the benchmark.
1. Overview

1.1. Policies: 9% energy savings target for 2016

Belgium has adopted a National Energy Efficiency Action Plan 2008-2016 (NEEAP) which sets an energy savings target of 27.5 TWh (319.7 Mtoe) for 2016 in buildings, transport and small industries (excluding sectors under ETS). Around 60 percent of the planned energy savings should be achieved in Flanders, 30 percent in Wallonia and 10 percent in Brussels-Capital.

There is no federal energy agency for energy efficiency. Each region develops its own set of incentives and regulations regarding energy efficiency. In 2009, a National Climate Plan for the period 2009-2012 was issued at a federal level with 11 strategic measures covering 6 sectors, including measures related to energy efficiency. In October 2009 Flanders issued its energy policy paper (2009-2014), which focuses on the implementation of EU directives on energy efficiency and energy services, as well as the energy performance of buildings. In April 2009 Wallonia prepared a draft update of the sustainable energy plan, proposing over 200 new measures on energy efficiency or renewable energy.

1.2. Energy consumption trends: above-average consumption levels

Overall consumption of energy per capita is 55 percent higher than the EU average: 5.2 toe compared with 3.3 toe for the EU in 2009. The difference is mainly due to industry, which has higher energy consumption per capita than average in the EU.

Total energy consumption had been stable since 1995, but in 2009 it fell by 5 percent due to a slowdown in economic activities.

Of all energy sources, oil meets most of Belgium’s energy demand, accounting for 41 percent in 2009. The share of natural gas increased from 17 percent in 1990 to 26 percent in 2009. Electricity has a stable market share of 22 percent. The use of coal has been scaled down since 1990, from 22 percent to 6 percent in 2009. Biomass represents a growing share of the total, reaching 5 percent in 2009 (2 percent in 1990).

Electricity consumption per capita is about 7,400 kWh, which is a full 30 percent higher than the average consumption in European countries. Electricity accounts for 17 percent of final energy consumption, up slightly since 1990 when it stood at 15 percent. Belgian electricity consumption increased at the regular pace of 2 percent/year between 1990 and 2008. In 2009 it dropped by 7 percent. The industrial sector accounts for a large share of overall electricity consumption, with around 50 percent of the total. That share has decreased slightly since 1990.

Figure 1: Total and final energy consumption trends

Figure 2: Distribution of final energy consumption by sector
1.3. Energy efficiency and CO\textsubscript{2} trends: low energy intensity

Total energy consumption per unit of GDP (primary energy intensity) is relatively low. Measured at purchasing power parity, it is 30 percent lower than the EU average, although it decreased at a slower pace. Energy intensity in Belgium has decreased by around 1 percent/year since 1990, compared with 1.7 percent/year on average in the EU. CO\textsubscript{2} emissions per unit of GDP (CO\textsubscript{2} intensity) fell at a faster pace than total energy intensity between 1990 and 2009 (2.3 percent/year compared with around 1 percent/year). More than 50 percent of the CO\textsubscript{2} intensity reduction is explained by fuel substitutions of coal by natural gas.

2. Power generation

2.1. Policies: electricity suppliers must reach a minimum share of renewables in 2012

According to the European Directive on the promotion of energy use from renewable sources, the national target is to increase the share of renewables in final energy consumption to 13 percent by 2020.

The regions oblige suppliers to distribute a certain percentage of electricity from renewable sources through a system of tradable certificates. In Flanders, the certificate system was implemented in January 2002 and includes a specific mechanism for cogeneration. The quota (excluding cogeneration) was 6 percent in 2010, and should account for 8 percent of deliveries in 2012 (13 percent in 2020). In Wallonia, the system was implemented in January 2003. The quotas are increased every year: in 2010, they represented 10 percent of the electricity deliveries in Wallonia, and they will increase by 1 point/year and reach 12 percent by 2012. The 2010 quota in the region of Brussels was 2.75 percent, and should reach 3.25 percent in 2012.

2.2. Power generation trends by source: power mix dominated by nuclear

Nuclear is the largest energy source for power generation. However, its share decreased from 60 percent in 1990 to around 55 percent. Among thermal sources, the use of natural gas surged from 8 percent in 1990 to over 30 percent of total electricity production in 2009. In turn, the share of coal was scaled down from 30 percent in 1990 to less than 10 percent at present, while oil plays a marginal role. Thermal sources represent 40 percent of overall electricity generation.
2.3. Efficiency of the power sector: large increase in the sector’s energy efficiency

The average efficiency of the power sector has increased regularly since 1990 and reached 38 percent in 2009. That improvement was driven by the development of natural gas and renewables in the power mix as well as the use of more efficient technologies, such as combined cycle and cogeneration plants. The increase in the efficiency of thermal power plants was even more noticeable, rising from 36 percent in 1990 to 43 percent in 2009. That improvement was mainly linked to the switch from coal to natural gas in the power mix, together with the spread of combined cycle plants, which now account for around 40 percent of the thermal electricity capacity.

The rate of transmission and distribution losses (T&D) is in line with the EU average. It amounted to 7 percent of the distributed volumes in 2009.

The average CO₂ emission factor has decreased by more than 40 percent since 1994, reaching 200 gCO₂/kWh produced in 2009. That sharp cut in the CO₂ emissions required per kWh produced was achieved through the wide-scale substitution of coal by gas, as well as efficiency improvements in thermal power generation.

3. Industry

3.1. Policies: voluntary agreements and quota system in Flanders

The energy efficiency policies in industry are implemented at the regional level, through voluntary agreements with each regional government. Flanders adopted a “benchmark” agree-
ment, including a commitment to bring the energy efficiency to the world top ten by 2012 (172 companies). In Wallonia, 13 sector associations (around 160 companies) signed a voluntary agreement under which they commit themselves to a quantified energy efficiency improvement over the period 2000-2012. In Flanders, the certificate system has included a specific mechanism for cogeneration since 2005. The quota for cogeneration was 1.19 percent in 2005 and should reach 5.23 percent as of 2012.

Flemish industrial companies with an annual energy consumption of more than 0.5 petajoules (PJ) (approximately equals 139,000 MWh of electricity) have to establish an energy plan involving energy saving measures with an internal rate of return (IRR) of 15 percent after tax. These measures have to be taken within the four following years after approval of their energy plan.

3.2. Energy consumption trends: drop in industrial energy consumption

Industrial energy consumption increased by 1.6 percent/year between 1990 and 2000. Since then it has decreased by 3 percent/year, with a noticeable 13 percent drop in 2009. Between 2000 and 2009 industrial energy consumption fell much faster than total energy consumption over the same period.

Figure 10: Industrial energy consumption

Natural gas accounted for 40 percent of industrial energy consumption in 2009, up from 25 percent in 1990. The share of electricity has also grown since 1990, from 22 percent to 30 percent in 2009. In turn, the use of coal was scaled down to 15 percent, compared with around 40 percent in 1990. Oil also accounts for a decreasing share in the sector’s consumption: it currently represents 7 percent of overall consumption, down from around 15 percent in 1990. The use of biomass is growing steadily and in 2009 accounted for 5 percent of overall industrial consumption.

Energy-intensive industries account for a large share of the sector’s energy consumption, with about 70 percent. Chemicals represent an increasing share of the total: 30 percent in 2009, compared with less than 20 percent in 1990. The share of the steel industry was drastically reduced over the period but still accounts for 22 percent of industrial energy consumption. The non-metallic minerals industry (cement, ceramics, etc.) has a stable market share of 12 percent. The share of the paper industry has doubled, from 3 percent in 1990 to 6 percent in 2009.

Figure 11: Energy consumption of industry, by source

Figure 12: Energy consumption of industry, by branch

3.3. Energy intensity trends: increase in industrial energy efficiency

Energy consumption per unit of industrial value added (energy intensity) decreased by 1.5 percent/year between 1990 and
2008. That rate is relatively high but remains lower than the EU average. An above-average fall in the energy consumption per tonne produced was seen in the steel industry (1.9 percent/year). In the cement industry, the consumption per tonne has decreased by 1.2 percent/year since 1990. The chemical industry’s energy consumption per unit of value added fell moderately (0.6 percent/year). By contrast, the paper industry has shown a large increase in the amount of energy consumed per tonne of paper produced (1.4 percent/year).

Industrial energy intensity must be calculated taking into account the influence of changes in the structure of the value added. The comparison with the variation of energy intensity at constant structure aims to assess the impact of that structural effect. So, between 2000 and 2008, the energy intensity of the manufacturing industry (ie, excluding mining and construction) showed a 2.3 percent/year decrease, while at constant structure the pace was a slower 1.8 percent/year. This means that structural changes towards less energy-intensive branches accounted for around 20 percent of the reduction in the energy intensity of manufacturing over the period, and that energy efficiency improvements can be estimated at 1.8 percent/year.

The share of CHP generation in industrial electricity consumption has surged since 2006, indicating a widespread dissemination of the technology in the sector. In 2009 CHP reached 7.5 percent of industrial electricity consumption, up from 3.5 percent in 2006.