Analysis of Energy Efficiency trends and policies in BELGIUM using ODYSSEE-MURE databases and tools

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Note

The quality of the Belgian (federal) energy statistics has been qualified as good by Eurostat for recent years. Unfortunately, some changes in methodology were only applied from 2010 onwards. Data before 2010 have not been revised yet, leading to series breaks and uncertainties for previous years.For the final energy consumption the ODYSSEE database currently uses federal statistics therefore, except for electricity and natural gas. For these last two data the total of energy consumptions of the three Regions is used because it provides more consistent time series over the period 2003-2010, in particular for the various branches of industry.

Even if the ODYSSEE database and tools contain data from 2000 for Belgium and the other Member States, we have decided to analyse time series from 2003 in this report because some series show huge breaks between 2000 and 2003.

*All figures are coming from the tools and/or the databases available on the ODYSSEE-MURE platform (*www.odyssee-mure.eu). Only the data available on the ODYSSEE-MURE website when this report was written have been used in this report. *Due to the change of the reference year (2003), we could not use the ODEX tool developped by the ODYSSEE-MURE consortium because it is not possible to change the reference date (2000) in the tool.*

EXECUTIVE SUMMARY

This report is the country report for Belgium on the latest phase of the European ODYSSEE-MURE project (www.odyssee-mure.eu), extending from February 2016 to July 2018. It provides an overview of energy efficiency trends (for the period 2003-2016) and of the main energy efficiency policy measures in Belgium, based on the ODYSSEE and the MURE databases, developed in the framework of the project.

The project gathers participants from the 28 EU Member States as well as from Norway, Serbia and Switzerland. It aims at monitoring energy efficiency trends and measures in Europe, using the two databases: ODYSSEE comprising detailed data on energy consumptions, activities and related CO2-emissions (around 1 000 data series by country) and MURE describing energy efficiency policy measures, including their impact (around 2 000 measures).

In this report, the final energy consumption is analysed both as a whole and by major final consumer sector: industry, residential, tertiary, transport. For each sector, it has been aimed to assess the size of energy efficiency changes, to identify main factors responsible for these changes and to assess the contributions of these factors.

The primary and the final energy intensities have decreased by 20% between 2003 and 2016. They represent the evolution of energy efficiency in economic terms, i.e. the quantity of energy used to produce one unit of GDP or value added. The degree of decrease in energy intensities depends on the sector : the household sector progressed steadily to a more than 25% decrease while the transport sector experienced fluctuations and tended to a 15% decrease.

In the Belgian federal state, energy efficiency policy is a responsibility of the three regions, with supporting measures from the federal government.

The regions have, each for its own territory, implemented the EPB directive [1]; promoted further energy efficiency by households and tertiary buildings through grants, compulsory audit schemes, awareness raising programmes, etc.; fostered energy savings in industry by signing voluntary agreements with industrial enterprises (Flanders, Wallonia); implemented mobility measures; and promoted renewable energies and cogeneration by setting up green and CHP certificates systems.

The main measures taken by the federal government are the transposition of the EU directives on labels and on Ecodesign, and the promotion of public transport by railway.

The main policies and measures have been introduced in the MURE database, with their major characteristics. Among the latter, quantitative impact evaluations (taken from the NEEAP[1]3 [2]) are available for the most important measures. The savings by region are synthesised in Table 1 (in terms of final energy savings).

[1] NEEAP: National Energy Efficiency Action Plan.

Table 1: Summary of final energy savings in the three regions

(ESD[2] + ETS[3] savings)

(GWh)	2015	2016	2020
Flanders	29 050	31 060	38 909
Wallonia	13 861	14 567	13 610
Brussels	2 392	2 898	4 838
Total	45 303	48 525	57 357

Source: NEEAP4 + VEA[4] (for ETS in Flanders)

[2] ESD: Energy Savings Directive [4].
[3] ETS: Emission Trading System (European directive 2003/87/EC).
[4] VEA: Vlaams Energieagentschap.

INTRODUCTION

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The project gathers participants from the 28 EU Member States plus Norway, Switzerland and Serbia. It aims at monitoring energy efficiency trends and measures in Europe, using the two databases: ODYSSEE comprising detailed data on energy consumptions, activities and related CO2-emissions and MURE describing energy efficiency policy measures, including their impact.

In this report the final energy consumption is analysed both as a whole and by major final consumer sector: industry, residential, tertiary, transport. For each sector it has been aimed to assess the size of energy efficiency changes, to identify main factors responsible for these changes and to assess the contributions of these factors.

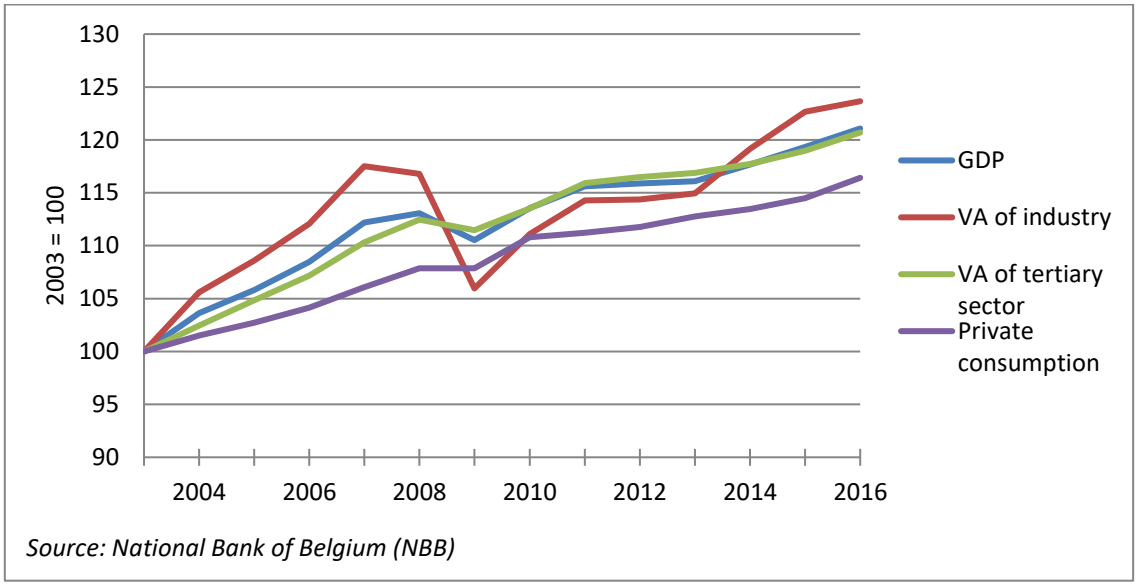
The energy efficiency is first analysed in economic terms, through energy intensities. When possible, in a second step, it is assessed using energy efficiency indicators, which aim to be closer to technical energy efficiency.

1 ECONOMIC AND ENERGY EFFICIENCY CONTEXT

1.1 ECONOMIC CONTEXT

Figure 1 shows the evolution in real terms of the main macro-economic indicators since 2003: GDP, value added of industry, value added of the tertiary sector and private consumption of households. After the dip in 2009 due to the economic crisis, with a fall of 2.8% in GDP, 1.4% in the tertiary sector and 8.5% in industry, the rebound that took place in 2010 and 2011 has been followed by a stagnation till 2013. There is however a clear rise of the economic growth since 2014 with an increase of 8.7% in three years' time for the value added in industry.

Figure 1: Evolution of GDP and other macro-economic indicators



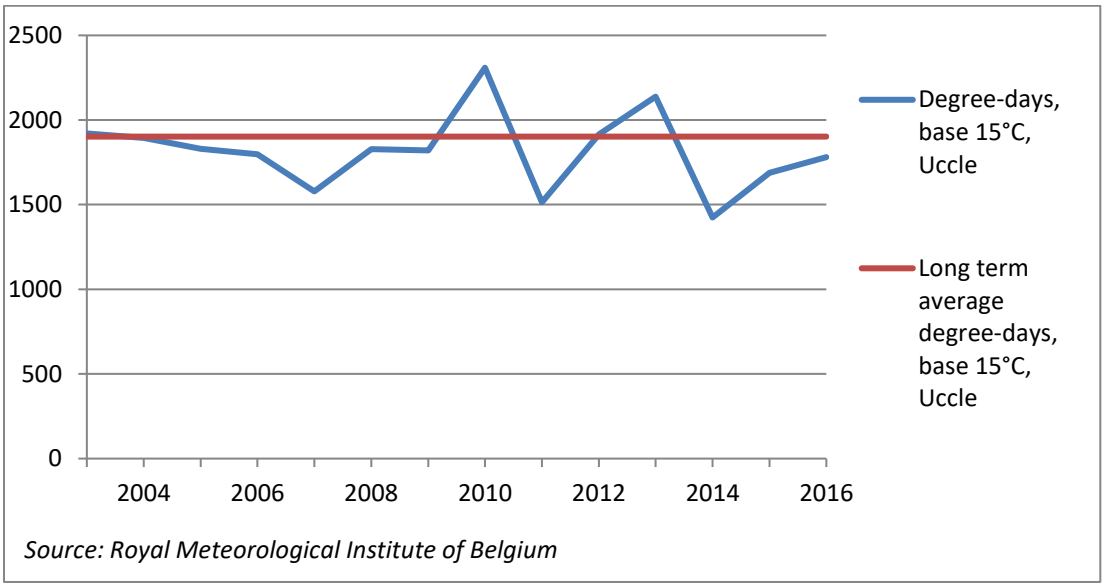
Source: National Bank of Belgium (NBB)

1.2 TOTAL ENERGY CONSUMPTION AND ENERGY INTENSITIES

1.2.1 INFLUENCE OF CLIMATE ON ENERGY CONSUMPTIONS

Outside temperature greatly influences energy consumption in the residential and the tertiary sectors during the winter. 15/15 heating degree-days observed in Uccle are used to monitor cool outside temperatures. Figure 2 shows the evolution of this number of heating degree-days since 2003, as well as the long term average (over the period 1986-2015).

Figure 2: Number of heating degree-days (15/15 Uccle)



Source: Royal Meteorological Institute of Belgium

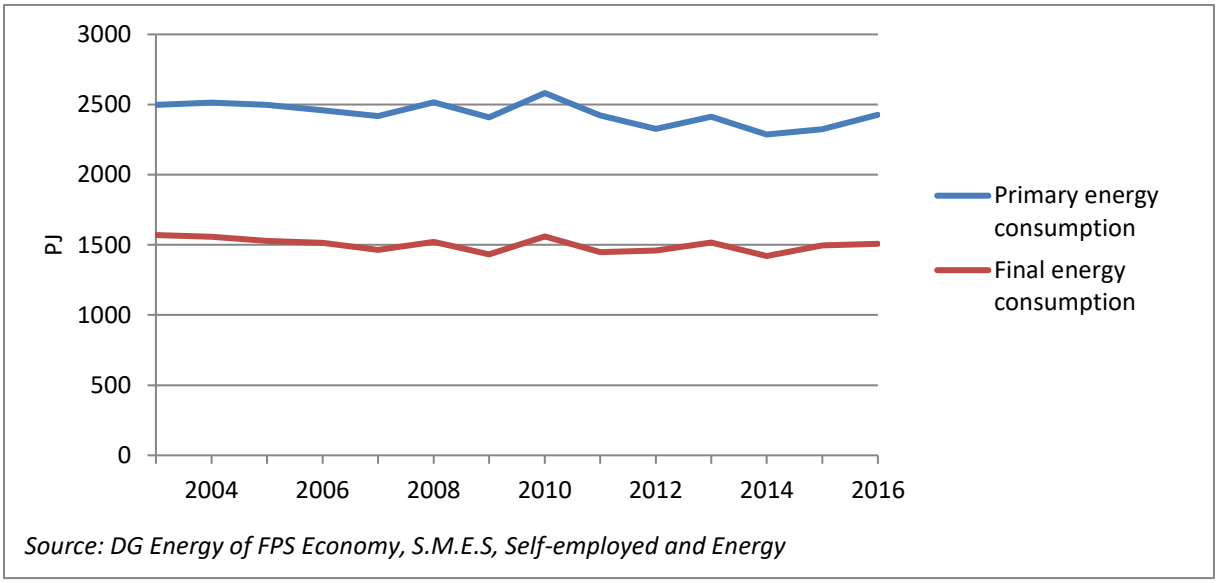
It is possible to correct data on energy consumption in the residential and the tertiary sectors thanks to heating degree-days. However, the correction methodology used in the ODYSSEE database tends to overcorrect consumptions, which leads to aberrant trends, especially for extreme years (2007, 2010, 2011, 2013 and 2014). Since the occurence of both extremely cold and extremely hot winters raised these past years (which tends to confirm climate change), we chose not to correct energy consumption in this report.

It is also good to mention that outside temperatures in the summer do not affect space heating (a year can be called cold even if the summer was extremely hot) but affect space cooling. This influence can be measured by cooling degree-days but they are not used in Belgium for now.

1.2.2 ENERGY CONSUMPTION TRENDS

We see in Figure 3 that both primary energy consumption and final energy consumption are rather stable in the studied period. A closer look at the yearly differences shows a drop of energy consumption caused by the economic crisis in 2009 (see Figure 1) and some climatic peaks (2010 and 2013 both being cold years for example). The difference between the patterns of primary energy consumption and final energy consumption is mainly due to the decrease of inland transformation (in electricity and coke plants) and the variation of net electricity imports (551 GWh in 2010 versus 20 999 GWh in 2015)

Figure 3: Evolution of total energy consumption

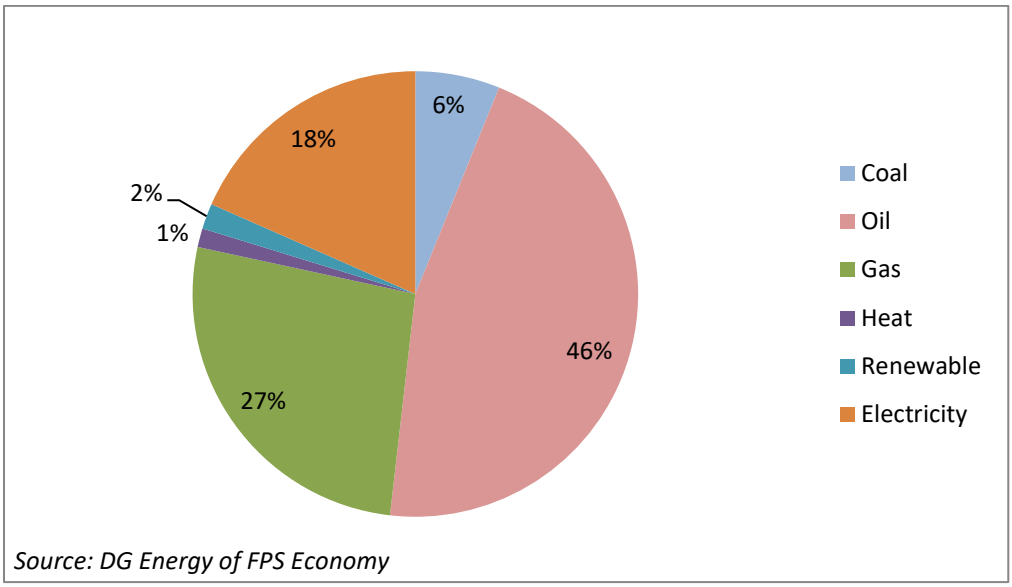


Source: DG Energy of FPS Economy, S.M.E.S, Self-employed and Energy

Comparing this figure with Figure 1, it is interesting to note that, while all macro-economic indicators have increased by around 20% since 2003, there is no increase of energy consumption.

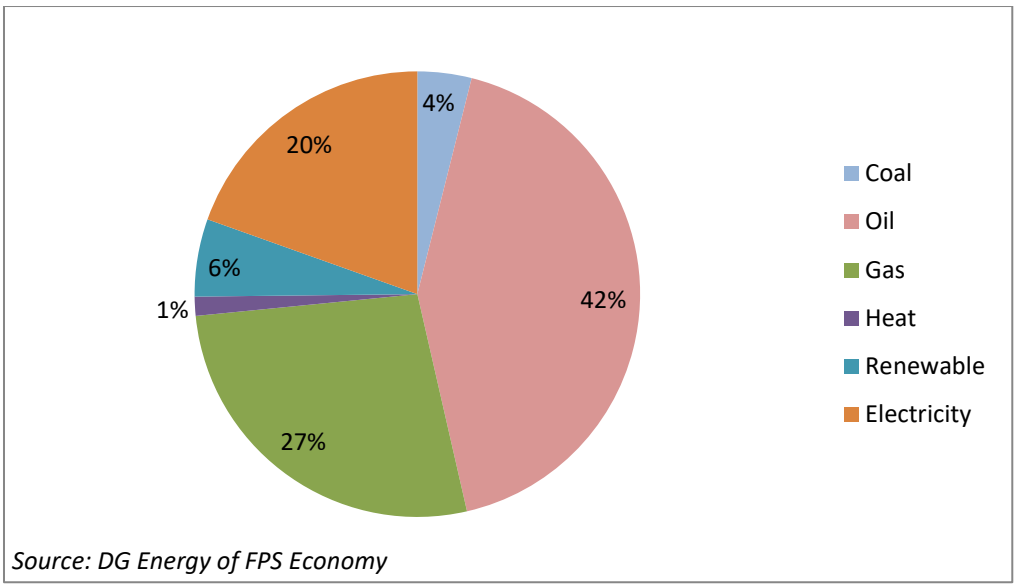
Looking at energy mixes of the total final consumption we can notice a rather stable evolution, with a fall of the share of coal, from 6% in 2003 to 4% in 2016, as well as the penetration of renewables, from 2% to 6% (see Figure 4 and Figure 5). Oil is still the biggest energy carrier in Belgium (42%) followed by gas (27%) and electricity (20%).

Figure 4: Total final energy consumption by energy carrier – 2003



Source: DG Energy of FPS Economy

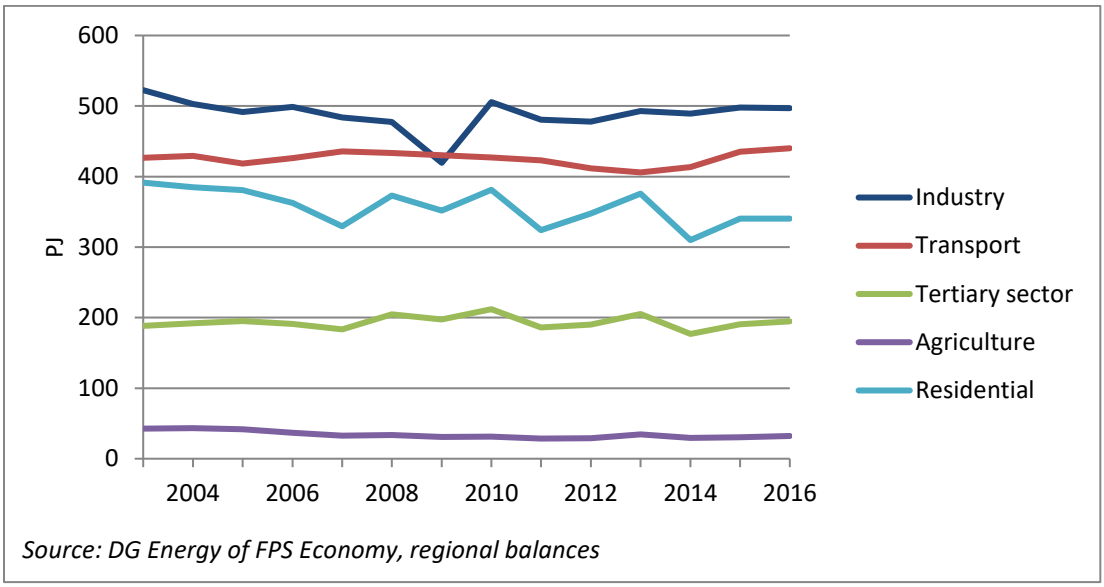
Figure 5: Total final energy consumption by energy carrier – 2016



Source: DG Energy of FPS Economy

The final energy consumption by major sector over the period 2003-2016 is shown in Figure 6. The main energy consumer is industry, but its share is lightly diminishing. It is followed by the transport and the residential sectors.

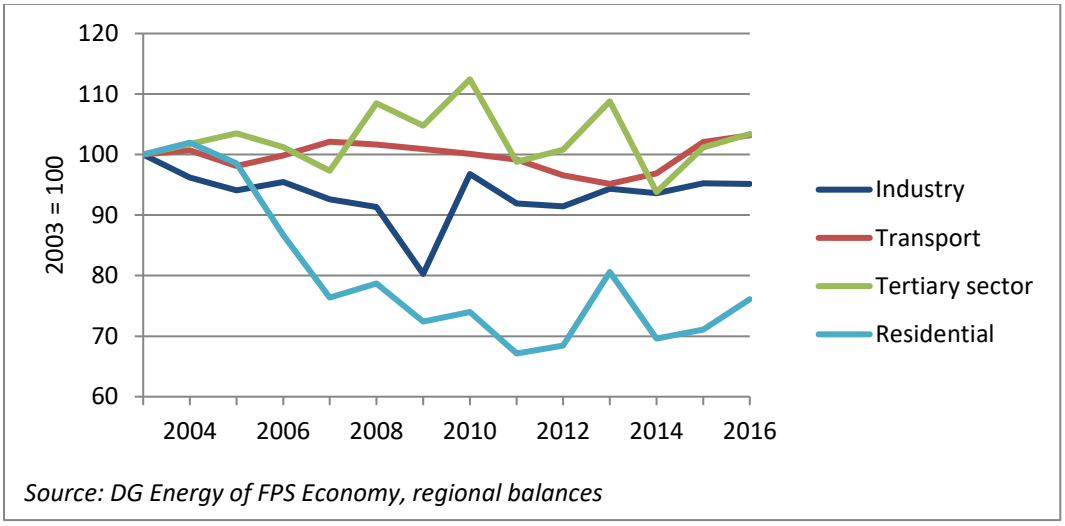
Figure 6: Final energy consumption by sector



Source: DG Energy of FPS Economy, regional balances

Figure 7 provides the evolution of the final energy consumption by sector from 2003 onwards.

Figure 7: Evolution of final energy consumption by sector



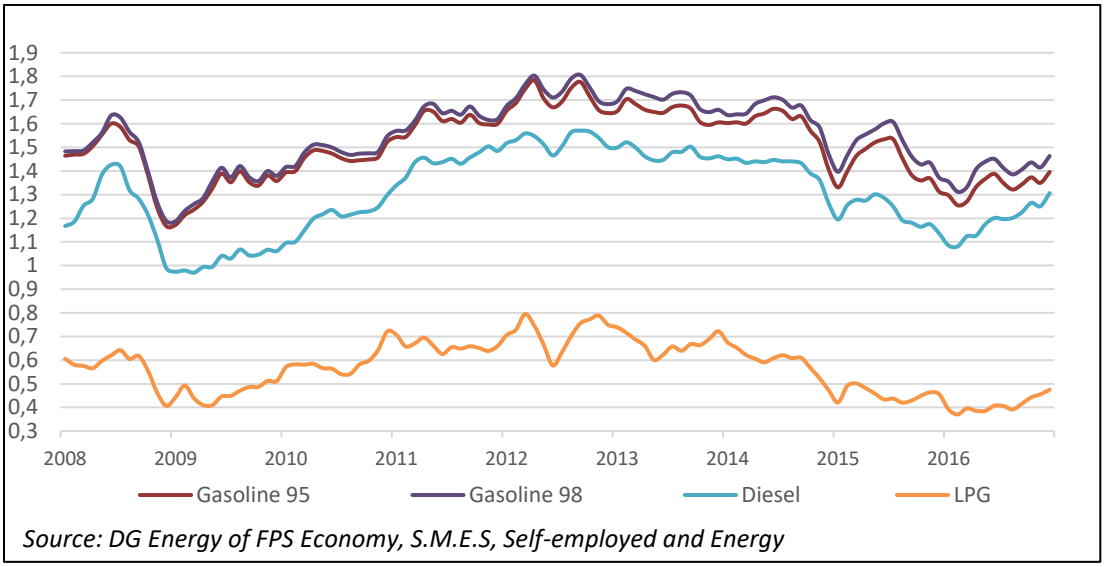
Source: DG Energy of FPS Economy, regional balances

As explained in chapter 1.2.1, we chose to look at the evolution of the final energy consumption without climate correction. The yearly evolutions observed in residential and tertiary sectors are thus high but they are coherent.

Generally, we see that final energy consumptions gradually decrease in the residential and industry sectors (with climatic fluctuations for the residential sector). Energy consumption in the tertiary sector increases till 2010 and then gradually decreases, remaining nonetheless higher than its 2003 level.

Finally, energy consumption in transport fluctuates in an inversely proportional way to prices of petroleum products (Figure 8), but increases over the last years.

Figure 8: Evolution of Belgian official maximum prices for petroleum products



Source: DG Energy of FPS Economy, S.M.E.S, Self-employed and Energy

A closer look at the yearly evolutions shows, in the residential and tertiary sectors, peaks in consumption in both sectors in 2010 and 2013 (cold years, with respectively 2 309 and 2 138 DD) and low consumptions in 2007, 2011 and 2014 (hot years, with respectively 1 684, 1 578, 1 515 and 1 424 DD). Knowing that the climate was similar in 2008 (1 828 DD) and 2009 (1 820 DD), we clearly notice the influence of the crisis, causing a dip in consumptions mostly in the industrial sector but also in the tertiary and residential sectors.

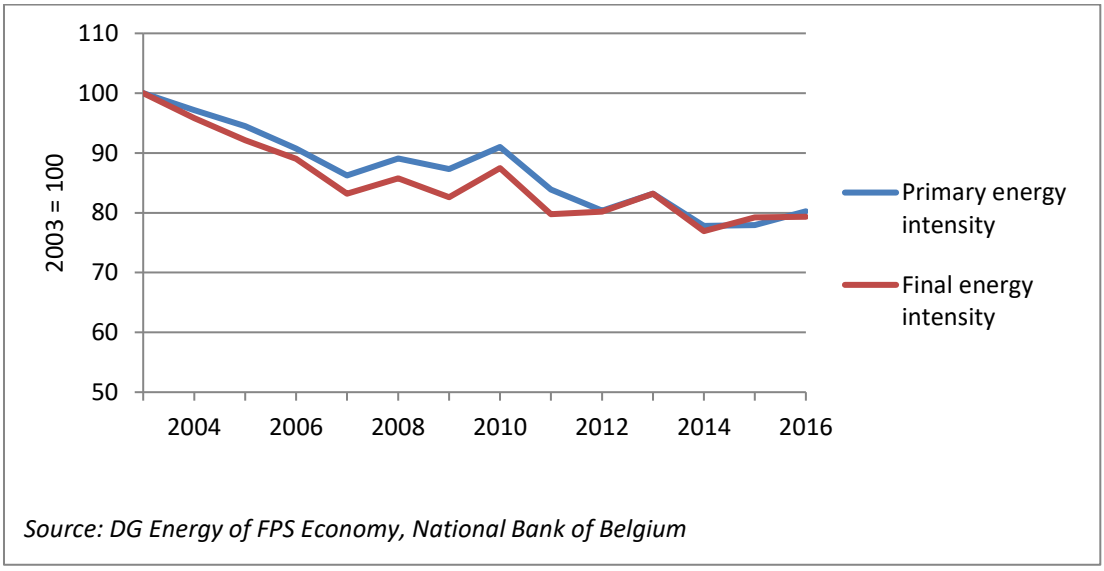
1.2.3 TRENDS IN ENERGY INTENSITY

1.2.3.1 ENERGY INTENSITY OF GDP

The energy intensity is obtained by dividing the energy consumption of a sector by its value added or, in case of the transport sector, by the GDP. It is an indicator of "economic" energy efficiency, in that it shows how much energy is being used to produce one unit of economic output.

Figure 9 shows the evolution of the energy intensity of both primary and final energy consumptions. The general decreasing trend confirms the decoupling of energy consumption from the economic activity over the whole period. However, the reduction in energy intensity has taken place at a lower rate from 2008. Like in every EU Member State, the low hanging fruits have been plucked and more effort is needed to realise the same rate of reduction.

Figure 9: Evolution of the energy intensity



Source: DG Energy of FPS Economy, National Bank of Belgium

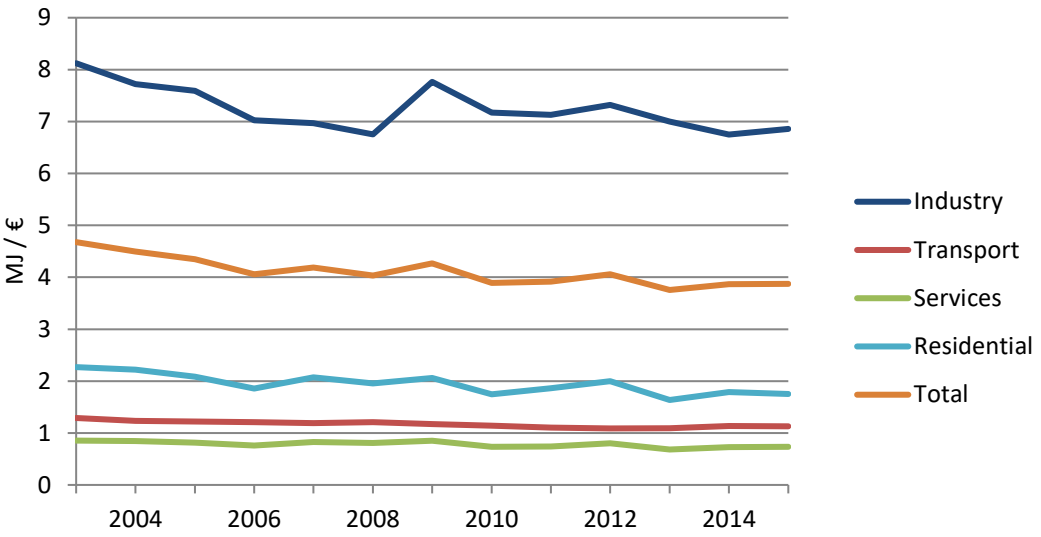
It is to be noted that the dips in 2007, 2011 and 2014 and the rises in 2010 and 2014 are due to climate.

1.2.3.2 ENERGY INTENSITY BY SECTOR

Energy intensities are shown by major end-use sector on Figure 10. They are defined as the energy consumption divided by the following, closely related, activity variables:

- value added, in the case of industry and the tertiary sector;
- private consumption of households (in euros), in the case of the residential sector;
- GDP, in the case of the transport sector.

Figure 10: Final energy intensity by sector



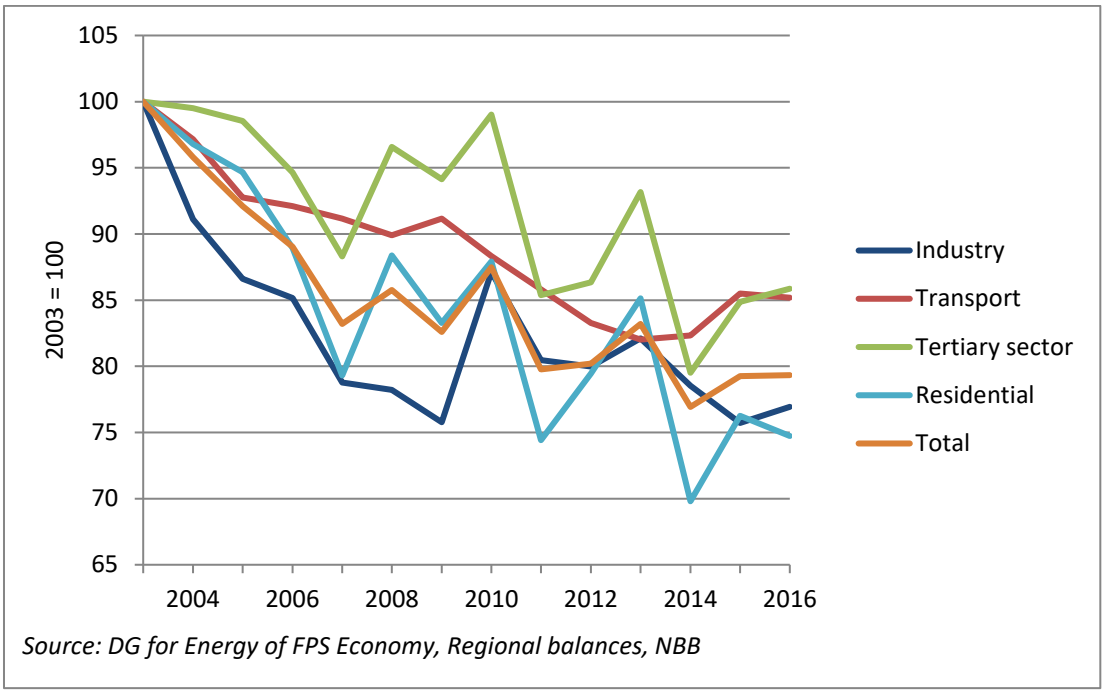
Source: DG Energy of FPS Economy, Regional balances, NBB

One can notice that, based on these definitions, the energy intensity of industry is much higher than those of the tertiary and the transport sectors.

The general trend is decreasing (Figure 11), the largest decrease taking place in industrial and residential sectors. For transport, we note a quite regular decrease till 2014. From 2015, energy intensity of transport begins to increase. Even if we did not really study this effect, we have to note that this increase is concomitant with the increase in prices of petroleum products in Belgium.

It should be stressed that these energy intensities remain imperfect measures, especially because the aggregated activity variables that are used are imperfect indicators of the actual activity changes. These indicators are influenced not only by energy efficiency, but also by structural effects taking place within each sector (e.g. a switch towards activities with either a lower or a higher energy consumption per unit of value added). Furthermore, as already said, data before 2010 have not been revised yet leading to series breaks and uncertainties for previous years. For instance, the jump between 2009 and 2010 consumptions (to the level of 2005) in industry is clearly not correct. We assume that it is, at least partly, due to a wrong affectation of non-energy use in the energy balances.

Figure 11: Evolution of final energy intensity by sector



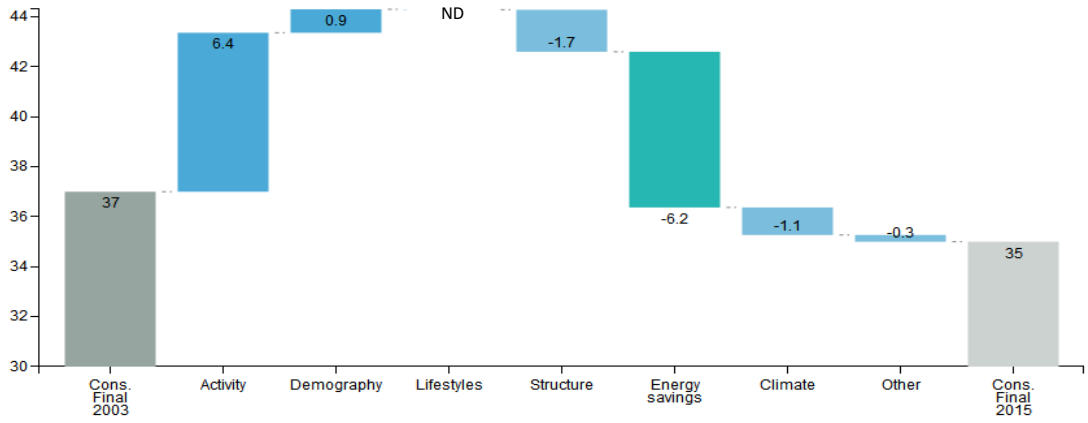
Source: DG for Energy of FPS Economy, Regional balances, NBB

In fact the total energy intensity has decreased more than the average of all the sectors. This reveals a structural effect corresponding to a shift away from industry (which has a higher intensity) towards less energy intensive sectors. Indeed, the share of industry in GDP is decreasing (Figure 1), while its energy intensity is much higher than that of the other sectors (Figure 10).

1.2.3.3 DECOMPOSITION OF THE VARIATION OF ENERGY CONSUMPTION

The reduction in energy intensity of GDP can be considered as the result of different contributions. Energy consumption can be affected by macroeconomic factors (activity, structure, …), demography and other factors on the one hand and by improvement of unit energy efficiency (called here "Energy savings" and calculated thanks to the ODEX) on the other hand. Figure 12 shows the main drivers of energy consumption variation between 2003 and 2015 (certain data are unavailable to make the calculations for 2016).

Figure 12: Main drivers of the energy consumption variation (Mtoe)



Two main factors contributed to increase energy consumption over the period: activity and demography. Nevertheless, the structure of the economy and "real" energy savings induced a decrease in energy consumption bigger than the increase induced by the two first factors. Since there was a warmer winter in 2015 than in 2003, outdoor temperatures further decreased the consumption in 2015.

The unit consumption effect ("real" energy savings) is the difference between the current energy intensity (here in 2015) and the energy intensity obtained by assuming that the four main sectors (industry, residential, tertiary, transport) would have kept their unit consumptions constant and equal to those of the year 2003 (reference year). It is here calculated by the technical ODEX.

The structural effect (Structure of the economy) is the difference between the energy intensity in the reference year (2003) and the current energy intensity (2015), assuming that the unit consumptions are those of the reference year. It represents the effect of the relative change in importance between sectors that have different energy intensities.

Thanks to this disaggregation, we can see that the decrease is partly due to structural effects (-1.7 Mtoe) but is more importantly due to "real" energy savings (-6.2 Mtoe).

The above overall analysis has limitations, because of its very aggregate level and the fact that the activity variables are imperfect. The results should therefore be interpreted with care. A better indicator of the actual energy efficiency would need to take structural effects into account at a more detailed level (e.g. by industrial branch), and preferably use activity variables expressed in physical units. Such analyses are carried out in the sectorial chapters.

1.3 ENERGY EFFICIENCY POLICY BACKGROUND

Belgium is a federal state, in which energy efficiency is a competence of the three Regions (Flanders, Wallonia and Brussels-Capital), with supporting measures from the federal government.

1.3.1 ENERGY EFFICIENCY TARGETS

In the framework of Art. 3 of the EED directive[5], Belgium has set an 'indicative energy efficiency target' of 18% reduction in primary energy consumption by 2020 relative to the 'Primes 2007' baseline. This produces a saving of 9,6 Mtoe. The corresponding final energy saving is 7,1 Mtoe (82,6 TWh). In practice, given the fixed baseline, this comes down to a target of 43,7 Mtoe for the primary energy consumption (32,5 Mtoe for the final energy consumption) in 2020 [3].

For 2016, the target set in the context of the ESD directive 2006/32/EC [4] is the sum of the commitments made by the three regions, which amounts to a final energy saving of 27,5 GWh.

1.3.2 ENERGY EFFICIENCY POLICIES

1.3.2.1 THE MURE POLICY MEASURES DATABASE

The main energy efficiency policy measures are represented in the MURE database, together with their main characteristics (www.measures-odyssee-mure.eu). For each measure the database comprises its code, its title, a number of 'descriptors' (Reference, Status, Active period, Semi-quantitative impact, and mention as to whether it is a European measure, a NEEAP[6] measure or an Article 7 measure of the EED directive), a 'detailed description' and, where available, a quantitative impact evaluation. A list of these measures with some of their descriptors is given in Annex 2.

In principle, only national measures are to be considered in the database. However, as the competences for energy efficiency are distributed pertain to the three regions, with support measures from the federal government, the policy measures have, in the case of Belgium, been introduced in MURE by competent entity (federal government or region). The name of the relevant authority (Flanders, Wallonia, Brussels or Federal government) is mentioned in the title of each measure.

Besides the national measures, the main EU-wide measures, which are common to all EU Member States (mainly EU directives), are also introduced in the database.

Policy measures are generally subject to a number of decisions written down in legislation (laws, royal decrees, regional government decrees…), which would be difficult to take into account individually.

[5] Energy Efficiency Directive : Directive 2012/27/EU [10].

[6] National Energy Efficiency Action Plan, in the framework of the EED directive [2].

Measures are often subject to improvements or adaptations, at different dates. Therefore it is not always easy to distinguish between a 'new measure' and the modification of an existing measure. Given this circumstance and the fact that regional measures are considered separately, the measures are represented at a relatively aggregated level, some of them comprising a significant number of 'sub-measures' or 'actions' all contributing to the same goal. This may explain the fact that some measures have an old starting date, although they comprise new components or have been significantly modified in a recent year. The details of the content and the modifications are mentioned in the 'detailed descriptions' of the measures.

The impact evaluations, in terms of energy savings, are those taken from the 4th NEEAP [2]. It should be noted that, in this plan, the federal measures are not evaluated separately from the regional measures, as their impact could overlap with the impact of the latter.

1.3.2.2 RECENT ENERGY EFFICIENCY MEASURES

Belgium submitted its fourth National Energy Efficiency Action Plan (NEEAP) to the European Commission in 2017 [2]. This plan (which contains the three regional NEEAPs) describes the policy measures of the federal and the regional authorities, and provides an estimate of the impact of the measures.

The regions have, each for its own territory, implemented the recast EPB directive [1]; promoted further energy efficiency by households and tertiary buildings through grants, compulsory audit schemes, awareness raising programmes, etc.; fostered energy savings in industry by signing voluntary agreements with industry (Flanders, Wallonia); implemented mobility measures; and promoted renewable energies and cogeneration by setting up green and CHP certificates systems.

The main measures taken by the federal government are the transposition of the EU directives on labelling and eco-design, public procurement and the promotion of public transport. The tax reductions for energy efficiency investments by households, except for roof insulation, and for the purchase of low CO2 emission cars no longer applies since 2013. Actions such as placement of insulation, heat pumps, etc. (to the extent that they can be regarded as work in real estate or assimilated operations) are subject to reduced VAT rate of 6 or 12%, if these actions are realised in context of a total concept of demolition and reconstruction under specific conditions (not as concept of renovation or construction of new buildings).

An important new measure taken up by the regions is the transposition of Art. 7 of the EED directive. For this, all three regions have decided not to impose quantitative energy efficiency obligations on energy suppliers or distributors They implemented alternative measures[7] to achieve equivalent results, mainly by awarding grants for energy saving investments and signing voluntary energy-efficiency agreements with industry, but also through regulation [5].

[7] As allowed by Art. 7(9).

More detail about the policy measures are given in the sectoral chapters of this report.

1.3.2.3 QUANTITATIVE IMPACT EVALUATIONS

In the framework of the NEEAPs, the EU Member States had to undertake a particular effort to quantitatively evaluate the impact of their measures, in terms of final or primary energy savings, ex-ante (for the year 2020) as well as ex-post (for the years 2015 and 2016). These impact evaluations are those that have been introduced in the MURE database.

A general overview of the measure impact evaluations is given in Table 2.

Table 2: Overview of the measure impact evaluations

Sector	Main objectives and measures	Final energy savings (GWh)		
		2015	2016	2020
Cross-sectoral	Public service obligation on electricity distribution network operators in Flanders	9 123	9 735	12 005
	Promotion of renewable energy and cogeneration through a Green Certificates system (Flanders and Wallonia)	3 472	3 343	4 269
Industry	Voluntary agreements with industry 2003-2020:			
	• Flanders:	9 048	9 995	12 571
	• Wallonia:	7 778	7 948	4 944
Buildings	Implementation of the Energy Performance of Buildings (EPB) directive, including previous K-level regulations (3 regions)	3 583	4 063	5 629
	Subsidies for energy saving investments in Wallonia and Brussels	4 043	4 362	5 189
Transport	Diverse set of measures in the transport sector in the three regions	6 421	7 179	8 576
Agriculture	Flanders - Subsidies for energy saving measures in horticulture (greenhouses)	831	1 045	1 045

Source: data from MURE, which are based on NEEAP4 [6][8]

[8] As the Brussels' NEEAP does not provide quantitative impacts by measure for 2020, for those measures the impact in 2020 has been here assumed the same as in 2016. This an underestimation, as can be noticed in Table 1, which provides the total impact in 2020.

1.3.2.4 GENERAL CROSS-CUTTING MEASURES

The main cross-cutting measures are given in Table 3. The other measures are presented in each of the sectoral chapters that follow.

Table 3: Main general cross-cutting measures

Code	Title	Final savings 2012 (GWh)	Final savings 2016 (GWh)	Final savings 2020 (GWh)
GEN-BEL9	Flanders - Promotion of photovoltaic solar panels via green certificates, preceded by subsidies	1 710	2 049	2 648
GEN-BEL14	Flanders - Imposing RUE-public service obligations on the electricity distribution network operators	7 983	11 405	14 630
GEN-BEL4	Wallonia - Green Certificates for renewable electricity and high yield cogeneration	289	644	1 000
GEN-BEL6	Wallonia - Subsidies for cogeneration	400	747	1 088
GEN-BEL8	Flanders - Promotion of qualitative cogeneration via cogeneration certificates (excluding ETS sites, which are included under measure IND-BEL22)	475	508	540

The largest contribution stems from measures GEN-BEL14, the public service obligation in Flanders. It should be noted that this measure mainly corresponds to grants for energy efficiency investments (mainly in dwellings) which for Brussels and Wallonia are taken into account in the residential and tertiary sectors (Table 4 and Figure 5).

2 ENERGY EFFICIENCY IN BUILDINGS

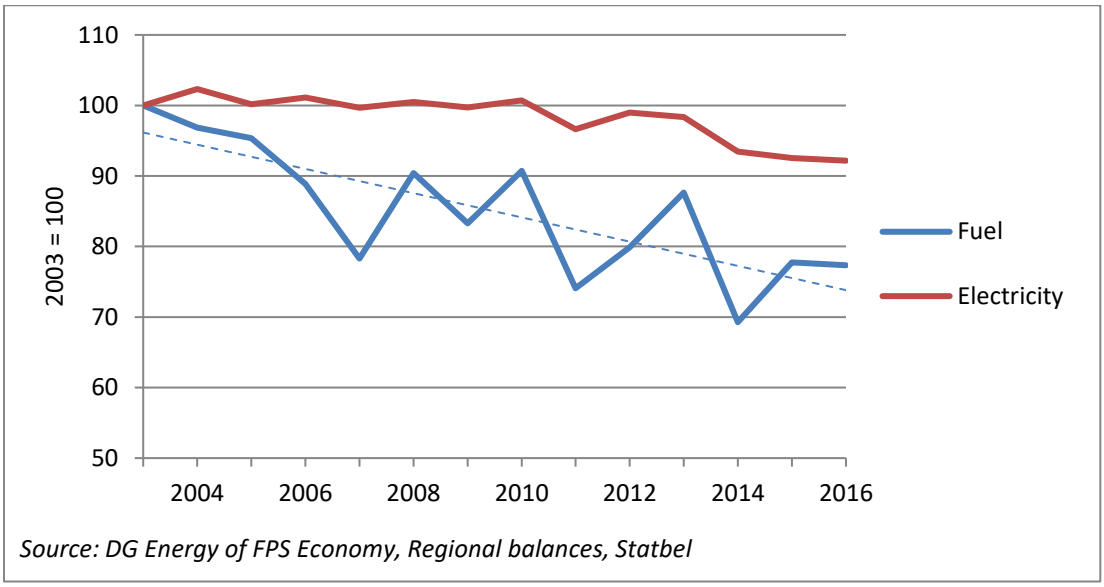
2.1 ENERGY EFFICIENCY TRENDS IN THE HOUSEHOLD SECTOR

2.1.1 CONSUMPTION PER INHABITANT

Per inhabitant, the fuel consumption of households has been on a decreasing trend (dotted line, Figure 13) over the whole period. The consumption peaks (downward as well as upward) are coherent with climatic variation (see Figure 2).

On the other hand, the electricity consumption per inhabitant has remained rather stable until 2010 and has slightly decreased from this point on. This is certainly driven, at least in part, by the entry into force of the Ecodesign and Energy label directives in 2009. It has to be noted that, in this sector, fuel and electricity are, to a certain degree, substitutes, and that the penetration of electric heating is significant, in particular through the rising use of heat pumps. The latest decrease in electricity consumption is thus further noteworthy.

Figure 13: Residential energy consumption per inhabitant



Source: DG Energy of FPS Economy, Regional balances, Statbel

The Belgian statistics on energy consumption for the residential sector are only disaggregated by fuel, not by type of use (space heating, water heating or other uses), which limits the possibilities to calculate indicators [9]. However, other socio-economic data (number of (occupied) dwellings, penetration of different appliances, …) allow to further analyse these decreases and will be analysed in the decomposition below.

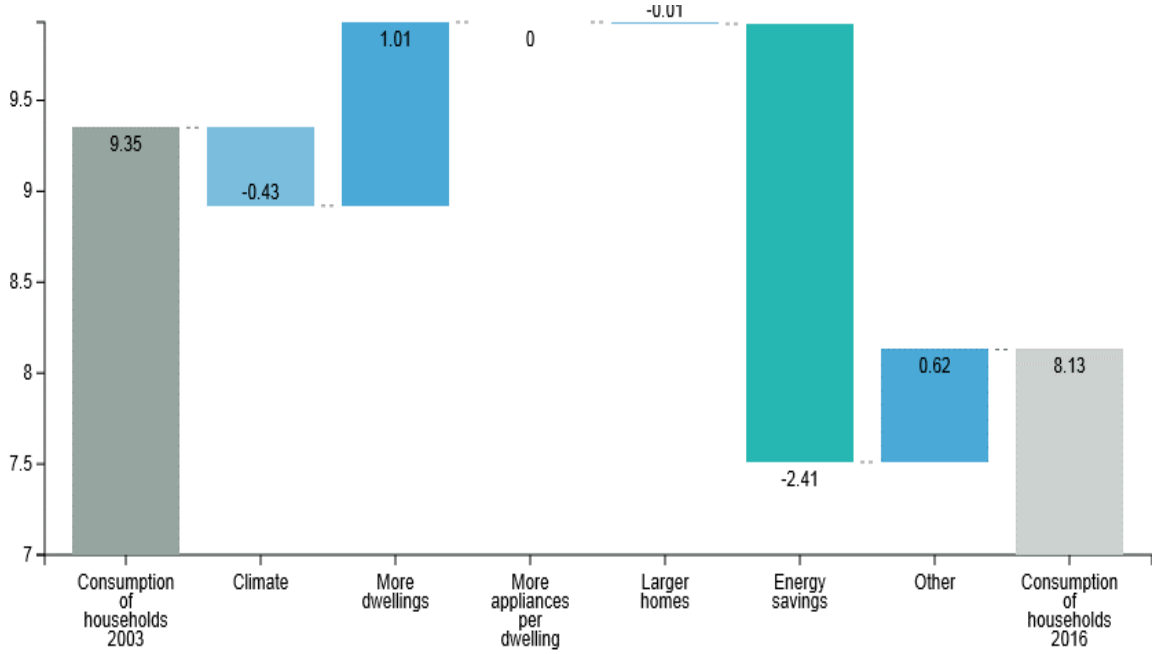
[9] These disaggregations are available from 2016 on but no historical analysis can be done for now.

2.1.2 DECOMPOSITION OF THE VARIATION OF ENERGY CONSUMPTION IN THE HOUSEHOLD SECTOR

Figure 14 decomposes the evolution of the energy consumption in households from 2003 to 2016 in the following components:

- the impact of an activity variable, chosen here as the number and the size of dwellings;
- the impact of climate (derived from the number of degree-days);
- the unit consumption effect, corresponding to energy savings; it shows the evolution of the energy consumption per dwelling, after correction for the climate.

Figure 14: Main drivers of the energy consumption variation in households (Mtoe)



Two main factors contributed to increase energy consumption over the period: more dwellings (or the activity effect) and "other". This "other" factor could hold various drivers as the fact that habits have changed (more heating, increased penetration of central heating or more intensive use of some appliances for instance).

The number of dwellings increased more than the global population, meaning that there are less inhabitants per dwelling. This fact may also influence the “other” factor in Figure 14. One of the consequences of this is also a light decrease of the size of dwellings, in contrast to the average trend in Europe.

Between 2003 and 2016, there is a moderate influence of the climate since 2003 and 2016 are both medium years (respectively 1 920 DD and 1 780 DD). This influence of climate is really noteworthy for all the extreme years (2007, 2010, 2011, 2013 and 2014).

Real energy savings, calculated thanks to the technical ODEX, is induced by better isolation, better energy efficiency of appliances but also better behaviour. These savings more than offset the effect of the drivers of consumption growth and explain the observed decrease in the general energy consumption in households.

It has to be noted that technical ODEX is calculated in a way that makes any decrease in “real” energy efficiency impossible. This induces that a temporary improvement of behaviour (which could have been led by economic crisis, higher energy prices or a promotional campaign for example) can’t be withdrawn from the technical ODEX. Some of the components of the “other” part may have been caused by this bias and counterbalance the “energy efficiency” effect.

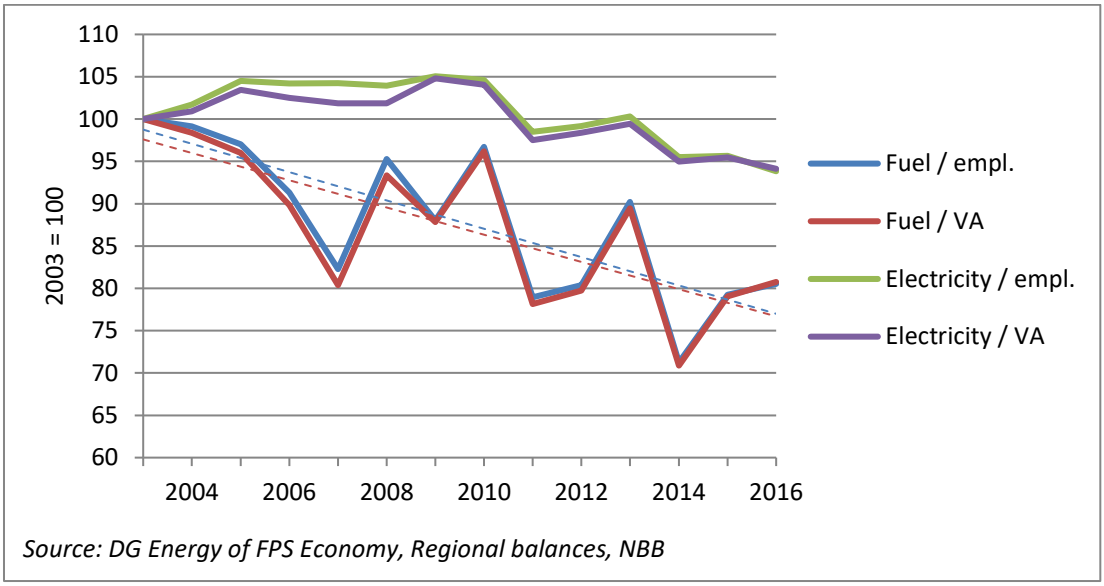
2.2 ENERGY EFFICIENCY TRENDS IN THE TERTIARY SECTOR

2.2.1 UNIT CONSUMPTIONS

For the tertiary sector different activity variables can be considered. Figure 15 shows the evolution of the energy consumption per employee and per unit of value added, for fuels and electricity.

Overall, there has been relatively little difference between the evolution of value added and employment, which means that the energy consumption per unit of value added and the energy consumption per employee are rather similar. The largest difference is between fuels and electricity. For the fuel consumption, the indicators fluctuate in a coherent way with climatic discrepancies, but there is an overall downward trend (dotted lines). Whereas for electricity, the unit consumptions are rather stable from 2003 to 2010, which could be explained by the fact that electricity savings were hidden by the increased penetration of electric devices. After 2010, a decreasing trend is also visible, which is certainly driven, at least in part, by the entry into force of the Ecodesign and Energy label directives in 2009.

Figure 15: Tertiary sector - Ratio Energy consumption/Activity



Source: DG Energy of FPS Economy, Regional balances, NBB

Belgian Statistics do not propose any disaggregation (by end-use or by sector) in the tertiary sector. Therefore, the use of the decomposition tool for the tertiary sector has no added value. Eurostat intents to improve these data as a medium-term objective.

2.3 ENERGY EFFICIENCY POLICIES

The main measures of the building sector are presented in Table 4 and Table 5, for the household and the tertiary sectors respectively, together with the impact evaluations from the 4th NEEAP [2].

The codes are those of the MURE database (www.odyssee-mure.eu), where a detailed description of each measure can be found.

Recent measures are the reinforcement of the EPB regulations for new buildings in the three regions (contained in measures HOU-BEL8, HOU-BEL25, HOU-BEL29). The federal tax deductions for households (HOU-BEL1) was abolished from 1 January 2012 (except for roof insulation). Wallonia has revised its grant system for households in 2015 (HOU-BEL30).

Table 4: Main measures in the household sector

Code	Title	Final savings 2015 (GWh)	Final savings 2016 (GWh)	Final savings 2020 (GWh)	
HOU-BEL23	Brussels - Assist households proactively with regard to energy and eco-construction to improve the quality and energy comfort of their residence	2	4		
HOU-BEL16	EU-related: Energy Labelling of Household Appliances (Directive 92/75/EC) - Federal Government - Labels on electrical household appliances				
HOU-BEL10	Brussels - Energy grant for households	409	483		
HOU-BEL30	Wallonia - Financial incentives for RUE investments in buildings	2 995	3 210	3 839	
HOU-BEL29	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Flanders - Insulation and energy performance regulation for residential buildings	2 897	3 298	4 533	*
HOU-BEL26	Brussels - Develop and promote exemplary buildings - BATEX (with virtually zero consumption and of high environmental quality)				**
HOU-BEL8	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Wallonia - Thermal regulation for buildings	558	637	968	***
HOU-BEL25	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Brussels - Act structurally on the demand through progressive reinforcement of the requirements of the EPB regulations in the residential sector	128	128		§
HOU-BEL24	Flanders - Reduction in property tax and gift tax for energy-efficient new residential buildings				§§

* Including the impact of TER-BEL28
** Included in TER-BEL16
*** Including the impact of TER-BEL20
§ Including the impact of TER-BEL7
§§ Included in HOU-BEL29

In the NEEAP, the residential and the tertiary sectors are aggregated under the building sector. Therefore the quantitative impact of some measures is only given for the building sector as a whole.

The main contribution is that of HOU-BEL30 (grants for energy saving investments in Wallonia). As mentioned earlier, the corresponding measure for Flanders is measure GEN-BEL14, classified under 'General cross-cutting measures'.

Table 5: Main measures in the tertiary sector

Code	Title	Final savings 2015 (GWh)	Final savings 2016 (GWh)	Final savings 2020 (GWh)	
TER-BEL13	Flanders - Subsidies for energy saving measures in horticulture (cultivation under glass)	1 074	1 045	1 045	§
TER-BEL17	Wallonia - Subsidies for RUE investments in Public Buildings	639	669	867	
TER-BEL21	Brussels - Energy grant for tertiary sector				*
TER-BEL18	Wallonia - Public lighting (including EPURE) + traffic lights	39	39	79	
TER-BEL14	Brussels - Impose a plan for reduction of energy consumption on major consumers ("PLAGE": Local Action Plan for Energy Management)	61	61		
TER-BEL28	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Flanders - Insulation and energy performance regulation for tertiary buildings				**
TER-BEL16	Brussels - Develop and promote exemplary buildings - BATEX (with virtually zero consumption and of high environmental quality) in the tertiary sector	48	57		
TER-BEL7	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Brussels - Act structurally on the demand through progressive reinforcement of the requirements of the EPB regulations in the tertiary sector				***
TER-BEL20	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Wallonia - Thermal regulation for tertiary buildings				+
TER-BEL19	Flanders - Reduction in property tax for energy-efficient tertiary buildings				++
TER-BEL29	EU-related: Recast Ecodesign Directive for Energy-related Products (Directive 2009/125/EC) - Transposition of Recast Ecodesign Directive 2009/32/EC				+++
TER-BEL15	Brussels - Compulsory energy audits for large buildings and large companies in the tertiary sector	42	53		

§ Mentioned for information. This measure pertains the agricultural sector, which in MURE is taken up in the tertiary sector (which is not the case for the ODYSSEE database and indicators.

* Included in HOU-BEL10

** Included in HOU-BEL29

*** Included in HOU-BEL25

+ Included in HOU-BEL8

++ Included in HOU-BEL28

+++ Included in the impact of the regional measures

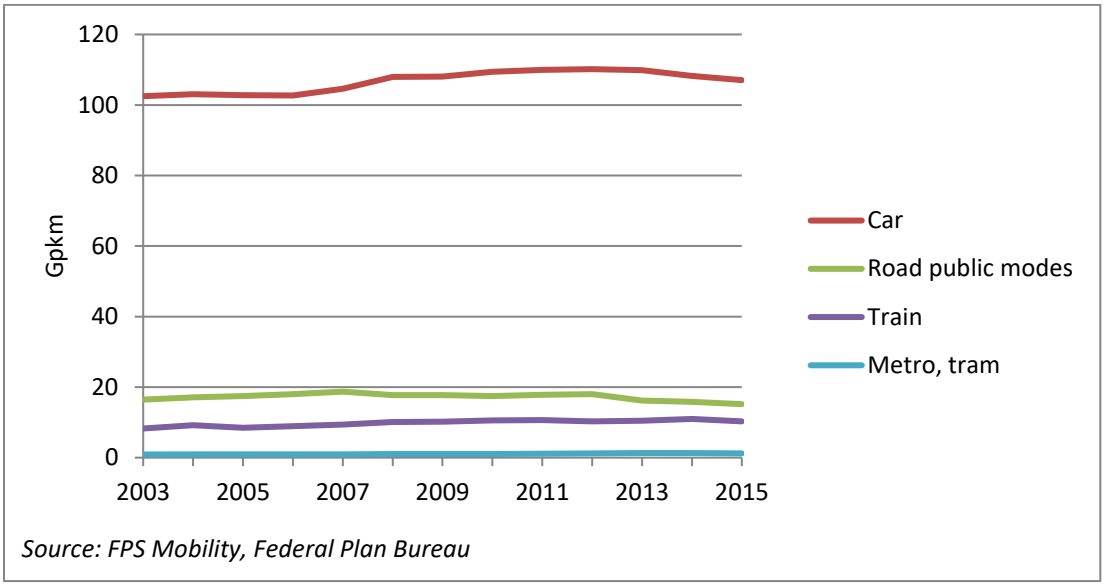
3 ENERGY EFFIENCY IN TRANSPORT

3.1 ENERGY EFFICIENCY TRENDS

3.1.1. ANALYSIS OF THE PASSENGER TRAFFIC

The traffic of passengers (Figure 16)) increased since 2003 (+ 5.6 Gpkm or 4.4%). In absolute value, this increase is mainly due to a rise of traffic by car (+ 4.6 Gpkm or 4.5%). However, the rise in rail transport is more noticeable since the traffic of passengers in train and metro & tram increased respectively by 25% (+2.1 Gpkm) and 33.3 % (+0.3 Gpkm). On the contrary, public transport modes by road lost passengers (-1.3 Gpkm or -7.9%).

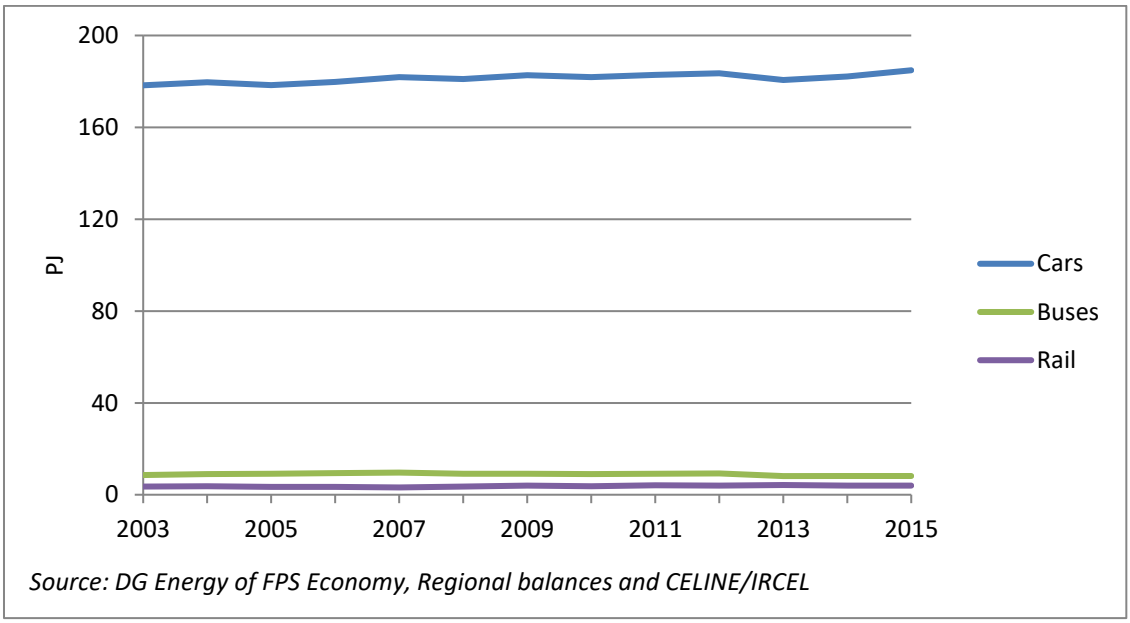
Figure 16: Evolution of passenger transport



Source: FPS Mobility, Federal Plan Bureau

Figure 17 shows that energy consumption for passenger transport increased by 3.3% (+6.4 PJ). This is mainly due to an increase of car consumption (+6.6 PJ or 3.7%) while energy consumption of rail increased by 11.7% (+0.4 PJ) and energy consumption of buses decreased by 5.2% (-0.4 PJ).

Figure 17: Evolution of energy consumption for passenger transport

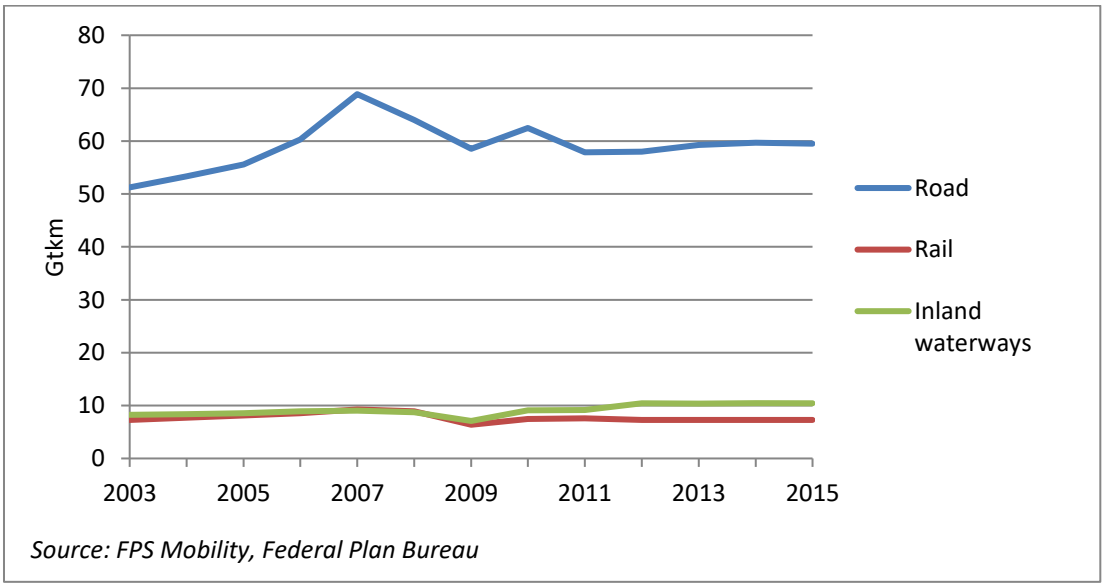


Source: DG Energy of FPS Economy, Regional balances and CELINE/IRCEL

3.1.2. ANALYSIS OF THE FREIGHT TRAFFIC

The overall freight transport (Figure 18) increased since 2003 (+10.5 Gtkm or 15.7%). This increase is however not linear: it increased by 30.5% (+20.4 Gtkm) from 2003 to 2007, decreased by 17.3% from 2007 to 2009 due to the financial crisis, and increased again by 7.3% (5.2 Gtkm) from 2009 to 2015. It is mainly due to road transport (+8.3 Gtkm or 16.2 %) but this rise happened before the financial crisis (+17.6 Gtkm or 34.4 %). There was a rise of only 1.7% (+1 Gtkm) from 2009 on. Freight transport on rail was rather stable (-0.2%). Freight transport on inland waterways increased dramatically (+2.2 Gtkm or 26.7%), especially since 2009 (+3.3 Gtkm or 47.1%).

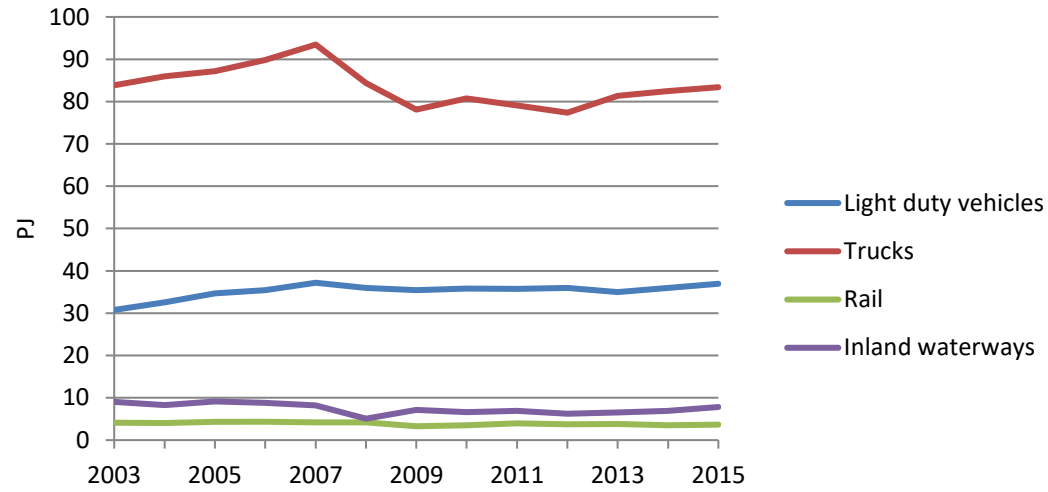
Figure 18: Evolution of freight transport



Source: FPS Mobility, Federal Plan Bureau

According to Figure 19, the energy consumption for freight transport increased by 3.1% (+4 PJ). This is due to an increase of road consumption, especially energy consumption by light duty vehicles (+6,1 PJ or 20%). The overall energy consumption in transport was rather stable through the whole period (-0.5 PJ or -0.5%) while energy consumption for freight transport on rail and inland waterways both decreased, respectively by 11.4% (-0.5 PJ) and 13.5% (-1.2 PJ). In the same way than for the number of goods transported (Figure 18), these evolutions are not linear, especially for trucks where we see a huge increase between 2003 and 2007 (+ 9.6 PJ or 11.5%) followed by a dramatic decrease between 2007 and 2009 (-15,4 PJ or 16,4%) due to the financial crisis and a rebound from 2009 on (+5.3 PJ or 6.7%).

Figure 19: Evolution of energy consumption for freight transport



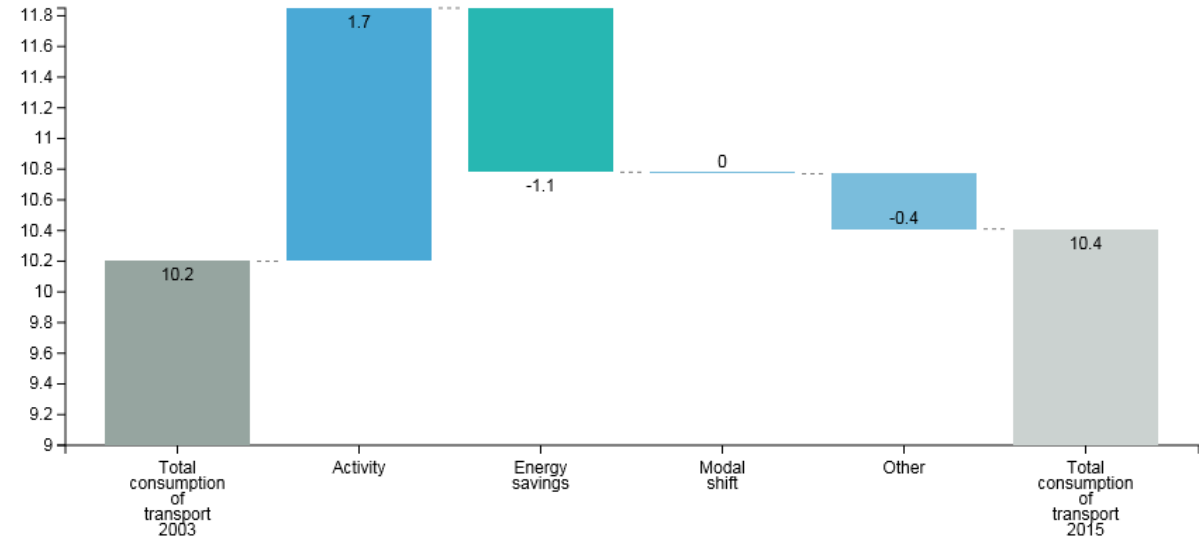
Source: DG Energy of FPS Economy, Regional balances and CELINE/IRCEL

3.1.3. DECOMPOSITION OF ENERGY CONSUMPTION IN THE TRANSPORT SECTOR

Figure 20 decomposes the evolution of energy consumption in the transport sector from 2003 to 2015 in the following components:

- the impact of an activity variable, chosen here as the number of passengers and goods transported;
- the modal shift for land transport (i.e. the change in the share of each transport mode in the total land traffic);
- the technical energy savings (i.e. the change in the efficiency of cars, trucks, airplanes, etc.);
- the other effects (i.e the behavioral effects and "negative savings" in freight transport due to low capacity utilisation).

Figure 20: Main drivers of the energy consumption variation in the transport sector (Mtoe)



Between 2003 and 2015 there was a dramatic increase of transport activity in Belgium, especially by road. This contributed to a large increase of energy consumption. Real energy savings and, at a smaller scale, modal shifts could counterbalance only a part of this raise of activity.

Real energy savings, calculated thanks to the technical ODEX, are induced by technical improvements in energy efficiency, but also by better behaviour. It has to be noted that the technical ODEX is calculated in a way that makes any decrease of "real" energy efficiency impossible. This means that a temporary improvement of behaviour (as eco-riding) or temporary problems (as low capacity utilisation) can't be withdrawn from the technical ODEX. These effects are counted in the "other" part.

3.2. ENERGY EFFICIENCY POLICIES

The main measures of the transport sector, as well as their impacts as evaluated in the 4th NEEAP [2] are presented in Table 6.

These measures generally represent a large set of diverse individual actions. For details see the descriptions in the MURE database (www.odyssee-mure.eu).

Table 6: Main measures in the transport sector

Code	Title	Final savings 2015 (GWh)	Final savings 2016 (GWh)	Final savings 2020 (GWh)
TRA-BEL20	Flanders - Measures improving the mobility needs and the environmental performance of transport	4 098	4 411	5 669
TRA-BEL12	Brussels - Measures in the transport sector (IRIS II Mobility Plan, COBRACE code, etc.)	1 701	2 112	
TRA-BEL4	Wallonia - Saving measures for transport in the public sector	222	221	243
TRA-BEL19	Wallonia - Financial incentives or funding devoted to transport	400	435	552

Striking is that a much larger impact is expected in Flanders than in Wallonia. The difference may be related to the use of a top-down approach in Flanders versus bottom-up method in Wallonia or to a lower number of measures.

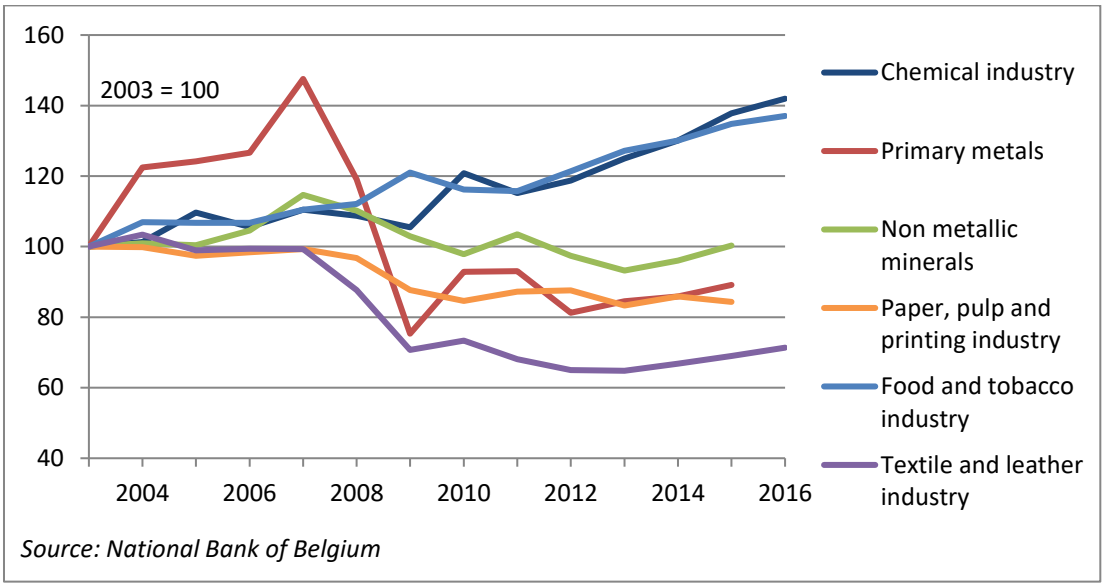
4. ENERGY EFFICIENCY IN INDUSTRY

4.1. ENERGY EFFICIENCY TRENDS

4.1.1. OVERALL CONTEXT

Figure 21 shows the evolution of value added by main industrial branch since the year 2003. There is a significant dispersion across sectors, the food and tobacco and chemical sectors having the largest growth, the textile industry the largest decline. The impact of the economic crisis can be seen as soon as 2008 for the primary metals (iron & steel and non-ferrous metals), in 2009 for the remaining branches. This impact also differs across sectors: textile, primary metals and paper all had a strong decline in 2009, while the food and chemical industries were only marginally affected. While the non-metallic minerals sector recovered in subsequent years, in 2015 textile & leather, primary metals and paper, pulp & printing sectors were still below their level of 2008.

Figure 21: Evolution of value added by industrial branch



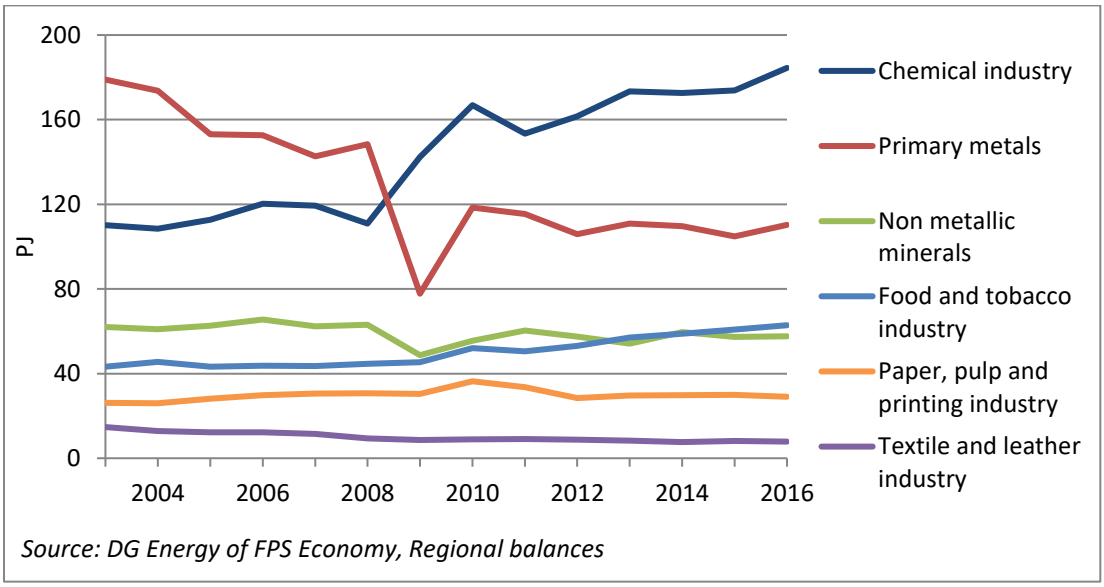
Source: National Bank of Belgium

4.1.2. ENERGY CONSUMPTION TRENDS

The energy consumptions by branch are shown on Figure 22.

Primary metals and chemicals are the two largest consumers by far. The primary metals sector has seen its consumption strongly decline, while the consumption of chemicals increased from 2010 on. It is to be noted that this increase can be due to a change of methodology in the treatment of non-energy use in chemical industry. This has thus to be taken with precaution.

Figure 22: Energy consumption by industrial branch



Source: DG Energy of FPS Economy, Regional balances

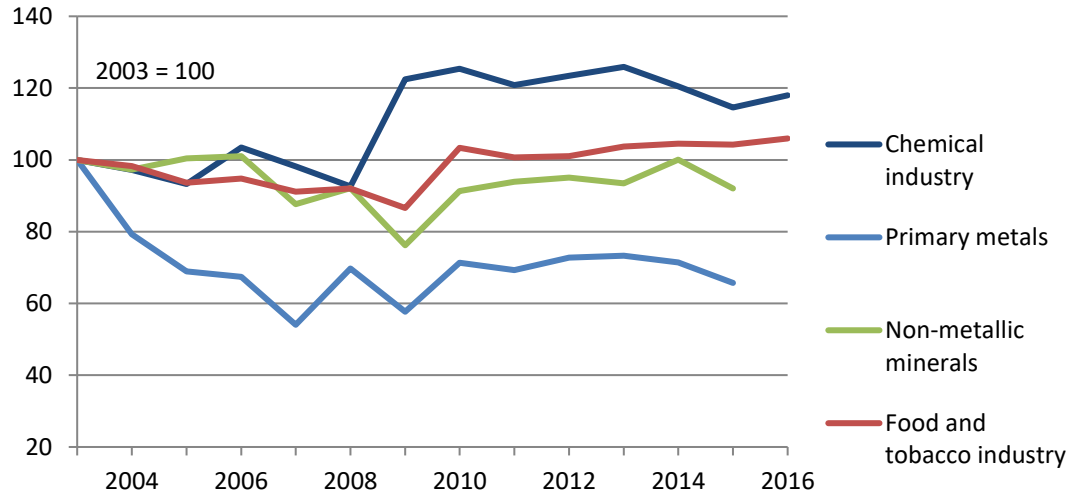
The non-metallic minerals sector (mainly cement, lime and glass production) had a pretty stable consumption over the entire period, except for a lower level in 2009, while the food & tobacco sector experienced a continuous growth.

4.1.3. ENERGY INTENSITY TRENDS/UNIT CONSUMPTION TRENDS

4.1.3.1. ENERGY INTENSITIES BY BRANCH

Figure 23 displays the evolution of the (final) energy intensity (total energy consumption/value added in constant prices) for the main industrial branches. It shows some reasonably large fluctuations.

Figure 23: Evolution of energy intensity by industrial branch



Source: DG Energy of FPS Economy, Regional balances, NBB

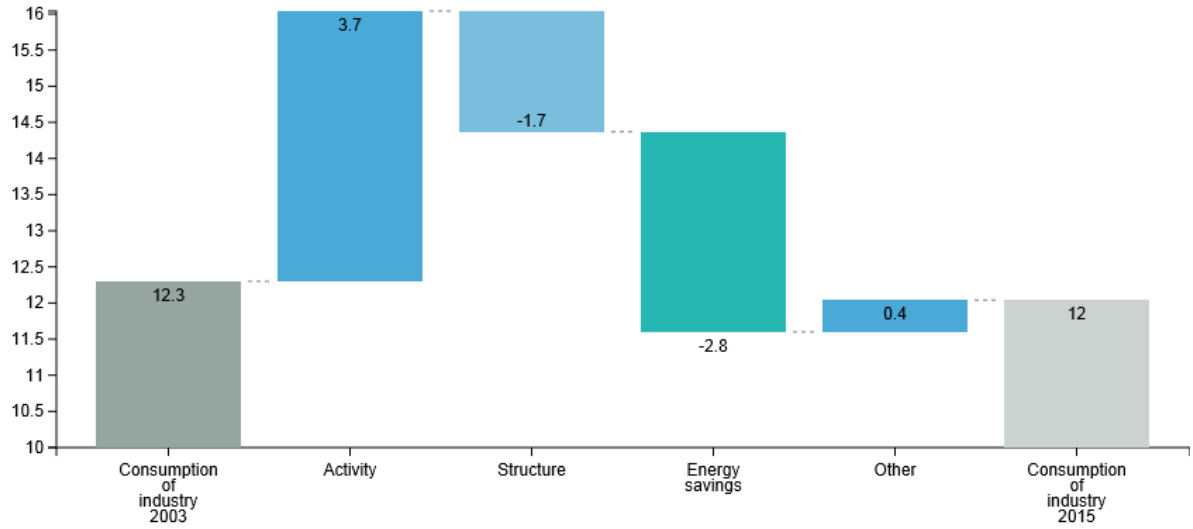
Overall, the energy intensity of the primary metals sector (predominantly steel industry) has a clear downward trend until 2007, followed by a stabilisation till 2015. The energy intensity of the non-metallic minerals and food and tobacco sectors were almost steady over the period. The energy intensity of chemical industry has substantially worsened (increased) in 2009 and 2010.

Remembering that energy consumption data were only revised till 2010, some of these figures can be explained by statistical series breaks, in particular due to the change in the treatment of non-energy use in the chemical industry. However, some sectors have obviously experienced increases in energy consumption and drops in value added.

4.1.3.2. DECOMPOSITION OF ENERGY CONSUMPTION IN THE INDUSTRY SECTOR

This section examines the drivers of the observed evolution of the energy intensity of industry.

Figure 24: Main drivers of the energy consumption variation in industry (Mtoe)



We can see that, other things being equal, activity would have increased energy consumption by 3.7 Mtoe. The change of structure between different industrial sectors (= structural effect) decreased energy consumption by 1.7 Mtoe. Real energy savings, calculated thanks to the technical ODEX, permit a decrease of an additional 2.8 Mtoe.

It should be remembered that the structural effect is calculated using the energy intensities of the reference year, in this case 2003. The results are sensitive to the choice of that reference year.

It should also be kept in mind that this analysis remains approximate, because the activity variable used (value added) is only an imperfect indicator of the activity level of each sector. Moreover, the results obtained are sensitive to the choice of the activity variable. The figure would have been different if the industrial production index had been used instead of the value added (e.g. in the chemical industry, the industrial production index has historically increased more slowly than the value added). Unfortunately we do not have good time series for this indicator. Another bias is that intra-branch structural effects are counted in energy savings, which is questionable.

4.2. ENERGY EFFICIENCY POLICIES

The main measures for industry in the MURE database are presented in Table 7. They essentially consist of the voluntary agreements signed in Flanders and Wallonia. In each of these regions, the latest set of agreements covers the period 2014-2020.

The codes are those of the MURE database (www.odyssee-mure.eu), where a detailed description of each measure can be found. The quantitative impacts, taken from the MURE database, include those of the ETS[10] sites.

Table 7: Main measures in industry

Code	Title	Final savings 2015 (GWh)	Final savings 2016 (GWh)	Final savings 2020 (GWh)
IND-BEL22	Flanders - Voluntary agreements in energy intensive industry	9 048	9 995	12 571
IND-BEL21	Wallonia - Voluntary agreements with industry	7 778	7 948	4 944

[10] Emission Trading System, under European directive 2003/87/EC.

5. REFERENCES

[1] "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)".

[2] "Belgian Energy Efficiency Action Plan according to the Directives 2006/32/EC and 2012/27/EU article 24.2 Annex XIV part 2, April 2014, https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-pl".

[3] "Notification of the indicative national energy efficiency target 2020 for Belgium According to the requirements of the Energy Efficiency Directive 2012/27/EU (http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/)," 2013.

[4] "Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC".

[5] "Notification of the alternative approach to EE Obligation Scheme for Belgium according to the requirements of the Energy Efficiency Directive 2012/27/EU Article 7.9 and Annex V".

[6] "Belgian Energy Efficiency Action Plan according to the Directives 2006/32/EC and 2012/27/EU article 24.2 Annex XIV part 2, April 2017, https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-pl".

[7] "Regulation (EC) No 443/2009 of 23 April 2009 setting emission performance standards for new passenger cars as part of the".

[8] European Environment Agency, "Monitoring CO2 emissions from new passenger cars in the EU: summary data for 2013," 2014.

[9] European Commission, "Reducing CO2 emissions from passenger cars - Monitoring of CO2 emissions - Decision 1753/2000 (repealed) and Regulation EC 443/2009 - http://ec.europa.eu/clima/policies/transport/vehicles/cars/documentation_en.htm".

[10] "Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC".

[11] ODYSSEE-MURE project, “Definition of the energy efficiency index ODEX (www.odyssee-indicators.org)”.

[12] D. Bosseboeuf, “Measuring energy efficiency progress in the EU: the energy efficiency index ODEX, presentation at ECEEE Summer Study 2005”.

[13] ICEDD, “Bilan énergétique de la Wallonie 2012 - Bilan de l'industrie et bilan global,” 2014.

[14] VITO, ICEDD, Statistics Belgium, “Energy Consumption Survey for Belgian households, study accomplished under the authority of EUROSTAT, FPS Economy, VEA, SPW, Brussels Environment,” 2012.

[15] “Belgian Energy Efficiency Action Plan according to the Directives 2006/32/EC and 2012/27/EU article 24.2 Annex XIV part 2, April 2014, https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-pl”.

6. ANNEXES

LIST OF BELGIAN POLICY MEASURES IN MURE

In the list below, the measures are ranked by sector and by starting year.

HOUSEHOLDS

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
HOU-BEL19	K-level thermal regulations of residential buildings (in use prior to the EPB directive)	Legislative/Normative	1985	2009	Yes	No	No
HOU-BEL23	Brussels - Assist households proactively with regard to energy and eco-construction to improve the quality and energy comfort of their residence	Information/Education	1996		Yes	No	YES
HOU-BEL15	EU-related: Performance of Heat Generators for Space Heating/Hot Water (Directive 92/42/EEC) - Federal government - Minimum efficiency requirements for new central heating boilers (household sector)	Legislative/Informative, Legislative/Normative	1998		No	YES	No
HOU-BEL16	EU-related: Energy Labelling of Household Appliances (Directive 92/75/EC) - Federal Government - Labels on electrical household appliances	Legislative/Informative	1998		Yes	YES	No
HOU-BEL13	Federal government - Reduced VAT for renovation of old buildings	Fiscal/Tariffs	2000		No	No	No
HOU-BEL31	Brussels - Act structurally on the supply by stimulating the sustainable building sector (household sector)	Information/Education	2000		Yes	No	No
HOU-BEL34	Wallonia - Training and information on rational use of energy (household sector)	Information/Education	2002		Yes	No	No

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
HOU-BEL1	Federal government - Tax deduction for energy saving measures in residential buildings	Fiscal/Tariffs	2003		Yes	No	No
HOU-BEL10	Brussels - Energy grant for households	Financial	2003		Yes	No	YES
HOU-BEL30	Wallonia - Financial incentives for RUE investments in buildings	Financial	2005		Yes	No	YES
HOU-BEL29	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Flanders - Insulation and energy performance regulation for residential buildings	Legislative/Informative, Legislative/Normative	2006		Yes	YES	YES
HOU-BEL35	Wallonia - Public service obligation - gas and electricity invoices (household sector)	Unknown	2006		Yes	No	No
HOU-BEL39	Federal government - Energy guzzlers web tool	Information/Education	2006		Yes	No	No
HOU-BEL22	Federal Government - Fund for the Reduction of the overall Cost of Energy (FRCE) in residential buildings*	Financial	2007	2014	Yes	No	No
HOU-BEL26	Brussels - Develop and promote exemplary buildings (with virtually zero consumption and of high environmental quality)	Financial	2007		Yes	No	YES

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
HOU-BEL36	Brussels – Green loans for energy efficiency investments by households	Financial	2007		Yes	No	No
HOU-BEL8	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Wallonia - Thermal regulation for buildings	Legislative/Informative, Legislative/Normative	2008		Yes	YES	YES
HOU-BEL25	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Brussels - Act structurally on the demand through progressive reinforcement of the requirements of the EPB regulations in the residential sector	Legislative/Informative, Legislative/Normative	2008		Yes	YES	YES
HOU-BEL24	Flanders - Reduction in property tax and gift tax for energy-efficient residential buildings	Fiscal/Tariffs	2009		Yes	No	YES

* This measure was transferred to the regions from January 2015.

TERTIARY SECTOR

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
TER-BEL31	Brussels - Support to SMEs	Information/Education/Training			No	No	No
TER-BEL1	K-level thermal regulation of tertiary buildings in Belgium (in use prior to the EPB directive)	Legislative/Normative	1986	2009	No	No	No
TER-BEL5	Federal government - Minimum efficiency requirements for new central heating boilers (tertiary sector)	Legislative/Normative	1997		No	No	No
TER-BEL4	EU-related: Energy Labelling Office Equipment (Energy Star) - Federal government - Energy Star label for office equipment	Information/Education/Training	1999		No	YES	No
TER-BEL23	Brussels - Act structurally on the supply by stimulating the sustainable and circular building sector (tertiary sector)	Information/Education/Training	2000		Yes	No	No
TER-BEL25	Wallonia - Training and information on rational use of energy (tertiary sector)	Information/Education/Training	2000		Yes	No	No
TER-BEL13	Flanders - Subsidies for energy saving measures in horticulture (cultivation under glass)	Financial	2001		Yes	No	YES

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
TER-BEL17	Wallonia - Subsidies for RUE investments in Public Buildings	Financial	2004		Yes	No	YES
TER-BEL21	Brussels - Energy grant for tertiary sector	Financial	2004		Yes	No	YES
TER-BEL18	Wallonia - Public lighting (including EPURE) + traffic lights	Financial	2005		Yes	No	YES
TER-BEL14	Brussels - Impose a plan for reduction of energy consumption on major consumers ("PLAGE": Local Action Plan for Energy Management)	Legislative/Informative	2006		Yes	No	YES
TER-BEL26	Wallonia - Public service obligation - gas and electricity invoices (tertiary sector)	Information/Education/Training	2006		Yes	No	No
TER-BEL28	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Flanders - Insulation and energy performance regulation for tertiary buildings	Legislative/Informative, Legislative/Normative	2006		Yes	YES	YES
TER-BEL8	Wallonia - Information on rational use of energy in public buildings	Financial, Information/Education/Training	2007		Yes	No	No
TER-BEL16	Brussels - Develop and promote exemplary buildings (with virtually zero consumption and of high environmental quality) in the tertiary sector	Financial, Information/Education/Training	2007		Yes	No	YES

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
TER-BEL7	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Brussels - Act structurally on the demand through progressive reinforcement of the requirements of the EPB regulations in the tertiary sector	Legislative/Informative, Legislative/Normative	2008		Yes	YES	YES
TER-BEL20	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Wallonia - Thermal regulation for tertiary buildings	Legislative/Informative, Legislative/Normative	2008		Yes	YES	YES
TER-BEL30	Promotion of energy efficiency in central government buildings	Unknown	2008		Yes	No	No
TER-BEL19	Flanders - Reduction in property tax for energy-efficient tertiary buildings	Fiscal/Tariffs	2009		Yes	No	YES
TER-BEL29	EU-related: Recast Ecodesign Directive for Energy-related Products (Directive 2009/125/EC) - Transposition of Recast Ecodesign Directive 2009/32/EC	Legislative/Normative	2011		Yes	YES	No
TER-BEL15	Brussels - Compulsory energy audits for large buildings and large companies in the tertiary sector	Legislative/Informative	2012		Yes	No	YES

INDUSTRY

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
IND-BEL9	Federal Government - Tax deduction for energy saving investments by companies	Fiscal/Tariffs	1993		Yes	No	No
IND-BEL24	Wallonia - Energy efficiency information actions for industry	Information/Education/Training	2000		Yes	No	No
IND-BEL22	Flanders - Voluntary agreements in energy intensive industry	Co-operative Measures	2003	2022	Yes	No	YES
IND-BEL4	Flanders - Energy efficiency criteria in environmental permits	Legislative/Informative	2004		No	No	No
IND-BEL21	Wallonia - Voluntary agreements with industry	Co-operative Measures	2004	2020	Yes	No	YES
IND-BEL23	Wallonia - Subsidies for energy saving investments in industry (excluding buildings)	Financial	2005	2015	Yes	No	YES

TRANSPORT

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
TRA-BEL21	Federal government - promotion of modal shift in transport	Co-operative Measures , Fiscal	1999		Yes	No	No
TRA-BEL8	Federal Government - Financial support for alternative transport between home and work	Fiscal	2001		Yes	No	No
TRA-BEL18	Federal Government - Modulation of the road and circulation taxes	Fiscal	2001		No	No	No
TRA-BEL9	Federal Government - Modification of the starting circulation tax	Fiscal	2002	2005	No	No	No
TRA-BEL20	Flanders - Measures improving the mobility needs and the environmental performance of transport	Financial, Fiscal, Information/Education/Training	2003	2012	Yes	No	YES
TRA-BEL12	Brussels - Measures in the transport sector (IRIS II Mobility Plan, COBRACE code, etc.)	Financial, Infrastructure, Legislative/Informative, SocialPlanning/Organisational	2004		Yes	No	YES
TRA-BEL17	Federal Government - Improvement of multimodal transport systems	Infrastructure	2005		No	No	No
TRA-BEL4	Wallonia - Saving measures for transport in the public sector	Infrastructure	2008		Yes	No	YES
TRA-BEL19	Wallonia - Financial incentives or funding devoted to transport	Co-operative Measures , Financial, Fiscal, Infrastructure	2008		Yes	No	YES

GENERAL CROSS-CUTTING

Code	Title	Type	Starting Year	Ending Year	NEEAP Measure	EU-related Measure	Quantitative Evaluation
GEN-BEL2	Energy Efficiency and the institutional framework (the federal Government and the Regions)	General Energy Efficiency / Climate Change / Renewable Programmes	1980		No	No	No
GEN-BEL11	Federal Government - Minimum efficiency requirements for new central-heating boilers on liquid fuels gas with a capacity>400 kW	Non-classified Measure Types	1997		No	No	No
GEN-BEL9	Flanders - Promotion of photovoltacc solar panels via green certificates, preceded by subsidies	Financial Measures, Legislative/Normative Measures, Market-based Instruments	1998	2020	Yes	No	YES
GEN-BEL14	Flanders - Imposing RUE-public service obligations on the electricity distribution network operators	Financial Measures, Legislative/Normative Measures	2003		Yes	No	YES
GEN-BEL4	Wallonia - Green Certificates for renewable electricity and high yield cogeneration	Market-based Instruments	2004		Yes	No	YES
GEN-BEL6	Wallonia - Subsidies for cogeneration	Financial Measures	2004		Yes	No	YES
GEN-BEL16	Brussels - Green Certificates for renewable electricity and high yield cogeneration	Market-based Instruments	2004		Yes	No	No
GEN-BEL7	Wallonia - Subsidies for the cogeneration in the public sector	Financial Measures	2005		Yes	No	YES
GEN-BEL8	Flanders - Promotion of qualitative cogeneration via cogeneration certificates	Legislative/Normative Measures, Market-based Instruments	2005		Yes	No	YES
GEN-BEL15	EU-related: Energy Efficiency Directive (EED) - Directive 2012/27/EU - Federal government - Procurement rules for the 'central administrations'	Non-classified Measure Types	2014		Yes	YES	No