



CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS

EPBD implementation in Belgium - Brussels Capital Region

Status in December 2016

AUTHORS

Michael Govaert, Geoffroy Knipping, Yves Morteahan, Isabelle Rolin, Jean-Henri Rouard, *Brussels Environment*

NATIONAL WEBSITES

www.environnement.brussels, www.leefmilieu.brussels

1. Introduction

In Belgium, the implementation of the EPBD is a regional responsibility. In the Brussels-Capital Region, the EPBD is under the responsibility of the Minister of the Government of the Brussels-Capital Region, responsible for housing, quality of life, environment and energy.

The first relevant ordinance (EPB ordinance) dates from June 2007, and in May 2013, the Brussels-Capital Region Government adopted a new ordinance for the Brussels Air, Climate and Energy Code (COBRACE), which entered into force on 1 January 2015. This ordinance transposes Directive 2010/31/EU¹.

2. Current Status of Implementation of the EPBD

2.1. Energy performance requirements: NEW BUILDINGS

2.1.i. Progress and current status of new buildings

The energy performance requirements have been mandatory since July 2008 for new buildings and for renovations in which a building permit is requested. The applicable energy performance requirements are set for primary energy consumption, insulation level, ventilation rate, overheating, technical installation, etc. These requirements are different for new or renovated buildings and units depending on the function (residential, office, educational, other non-residential). These requirements have been strengthened over the years, and in 2011, the energy performance requirement (E-level²) was tightened and became E70 (for

housing) and E75 (for offices and schools). Moreover, a requirement regarding thermal bridges was introduced. The reduction in energy consumption linked to this reinforcement of requirements has been evaluated at 25% by simulation.

In 2014, the global insulation requirement for the envelope (K-level³) K40 (for housing) and K45 (for offices and schools) did not change, but some maximum U-values were tightened for all new or retrofitted elements of the building envelope.

In 2015, the E-level and K-level requirements for housing, offices and schools were replaced by two new requirements, referred to as 'very high performance' requirements, one concerning the total primary energy consumption (PEC), and the other concerning the net heating requirement (NHR). The requirements by type of units are presented in Table 1.

Building/Unit	Net Heating Requirement (NHR)	Primary Energy Consumption (PEC)
Residential	15 kWh/m ² .year or X kWh/m ² .year	45 + max(0 ; 30-7.5°C) + 15 * max(0 ; 192/V _{EPR} -1) kWh/m ² .year
Offices and Schools	15 kWh/m ² .year or X kWh/m ² .year	95-(2.5°C) kWh/m ² .year or (95-(2.5°C)) + (1,2*(X-15)) kWh/m ² .year
Other	-	-

* The 'X' is an alternative requirement that has been designed for EPB-units whose poor orientation or compactness makes it unfeasible to enforce compliance with a net heating energy requirement of 15 kWh/m².year.

EPB units are defined in the COBRACE as a set of rooms in the same protected volume, which is designed or altered to be used separately.

Table 1. Since 2015 requirements for new units by unit type.*

Units considered as new (over 75% change in the envelope and replacement of all the technical installations) are subjected to the same requirements as new units, aside from a 20% loss in the net energy use for heating requirement as of the total primary energy consumption.

As of 1 July 2017, the requirement for the total energy consumption (PEC) is extended to all non-residential buildings and units (offices, schools, shops, healthcare facilities, courts, laboratories) (Table 2).

Building/Unit	Net Heating Requirement (NHR)	Primary Energy Consumption (PEC)
Residential	15 kWh/m ² .year or X kWh/m ² .year	45 + max(0 ; 30-7.5 * C)+15*max(0 ; 192/V _{EPR} -1) kWh/m ² .year
Non-Residential	-	$\frac{\sum_f A_{gross\ fct\ f} \cdot PEC_{max\ fct\ f, Uref}}{A_{gross}}$ kWh/m ² .year With: $PEC_{max\ fct\ f, Uref} = Y \cdot E_{spec\ ann\ prim\ en\ cons, ref}$ With: <i>E_{spec ann prim en cons, ref}</i> : the primary energy consumption of the reference building/unit Y**: For functions 'offices', 'teaching' and 'technical spaces': Y = 0.6 For all the other non-residential functions: Y = 0.9
Industrial	-	-

* The 'X' is an alternative requirement that has been designed for EPB-units whose poor orientation or compactness makes it unfeasible to enforce compliance with a net heating energy requirement of 15 kWh/m².year.

EPB units are defined in the COBRACE as a set of rooms in the same protected volume, which is designed or altered to be used separately.

** The 'Y' value will decrease gradually by 2021.

Table 2. As of 1 July 2017, requirements for new units by unit type*.

2.1.ii. Format of national transposition and implementation of existing regulations

In 2013, COBRACE⁴ replaced the 2007 EPB ordinance and transposed Directive 2010/31/EU. Several decrees (available on the Brussels Environment website⁵) describe the procedures to be followed and the calculation method and requirements to be met. A set of resources are available for construction sector professionals, e.g., a handbook, info-sheets, and FAQ, available on the Brussels Environment website⁶. In 2015, an evaluation of the EPB-legislation in the Brussels-Capital Region was realised. In November 2015, the government approved the recommendations made by the real estate and construction sectors.

The calculation procedure is defined in an executive order adopted on 21 February 2013. The method is similar to those established in the Flemish and Walloon Regions. This method has been modified by a new

executive order coming into force on 1 July 2017. The calculation method for primary energy already included the input of RES, e.g., solar energy (thermal and photovoltaic), biomass heating, geothermal heating and heat pump systems, as well as passive cooling techniques. Changes implemented in July 2017 integrate, among others, the prescriptions of the “Ecodesign” Directive 2009/125/EC in the calculation.

All new (or considered as new⁷) residential building-units must respect the same primary energy requirement (PEC) expressed in kWh/m². For all new (or considered as new) non-residential buildings and units, the primary requirements are specified by means of a virtual reference building or unit, which coincides with the actual unit in geometry, floor area, orientation and functionality. Due to this reference building approach, each new building or unit has an individual energy performance requirement that takes its specific details into account. This requirement is also expressed in kWh/m² (Table 2).

The compliance of the procedure and energy performance requirements are checked by the Brussels Environment Office. The percentage of buildings not meeting one or more of the requirements is less than 6%. The fines are established in the Cobrace Art. 2.6.1. Most of the fines are imposed for not meeting ventilation requirements, whereas non-compliance with the primary energy requirement (E-level before 2015, PEC after 2015) is extremely rare.

Professionals responsible for monitoring projects (called EPB advisors) for new buildings and major renovations must be accredited. To become accredited, they must have an architecture or engineering degree and have followed 5-day training sessions and retraining sessions when requested by Brussels Environment Office.

Since 2017, an independent organisation performs an inspection of the quality of the work on a randomly selected amount of EPB-advisors. The EPB-advisor can be suspended if the requirements are not met.

2.1.iii. Action plan for progression to NZEB for new buildings

In the Brussels-Capital Region, the NZEB obligation implemented to comply with Article 9 of Directive 2010/31/EU has been integrated into COBRACE and will make NZEB obligatory by 2021 (2019 for public buildings).

The Brussels-Capital Region has set up ambitious energy standards for new constructions, which was applied starting in 2015. These standards target “nearly zero or very low energy consumption” and are inspired by the “passive standard”, where high-energy performance is first achieved similarly to the NZEB requirements. These standards are presented in Table 1.

The 2015 EPBD requirements are very ambitious for an urban context and comply with the nearly zero-emission objective. The energy losses are in fact reduced to their minimum (from a cost-optimal perspective) and the need for compensation by renewable energy is implied by the requirement to fulfil the maximum primary energy consumption requirement (45 kWh/m².year); however, the specific RES share is not quantified.

2.1.iv. Requirements for systems and / or building components for new buildings

A study on the revision of the requirements for heating systems was carried out in 2015 and 2016. The results will be incorporated into a revision of the regulations in 2018.

2.II. Energy performance requirements: EXISTING BUILDINGS

2.II.i. Progress and current status of existing buildings

All types of building units (residential, commercial and public buildings) undergoing renovations are required to obtain a building permit and have to comply with the same U-value requirement level as a new building unit. They also need to comply with a minimum requirement of ventilation rate. In addition, a building undergoing renovations of more than 75% of its surface is subject to the requirements of primary energy consumption (PEC) (like new units).

2.II.ii. Plans to improve the existing building stock

The first step made was to raise awareness of the energy issue and to technically prepare the construction sector. Therefore, advanced training internships are given by the Brussels Environment Office to architects, design and technical consultants, engineers, professional project owners, developers, building managers and contractors; free specialist services are offered to help inhabitants reduce their consumption (www.maisonenergiehuis.be) and high performance exemplary projects are subsidised by the Region.

Based on the return of all these actions, the Brussels Environment Office is currently establishing a renovation strategy and is defining the NZEB levels for all types of building.

To promote renewable energy in existing public buildings, a subsidy of 5 million €/year over the course of four years until 2020 is planned for installing PV panels on the roofs of these buildings.

Another subsidy of 10 million € is foreseen to installing RES in multi-family houses owned by public authorities.

2.II.iii. Regulation of system performance, distinct from whole building performance

A study on the revision of the requirements for heating systems was carried out in 2015 and 2016. The results will be incorporated into a revision of the regulations during 2018.

2.II.iv. Encouragement of intelligent metering

Since 2012, an annual subsidy of 368,188 € is provided for the development and availability of the tool NRClick⁸ for the Brussels Region's communes. NRClick's goal is to assist public authorities in their energy management (purchase, distribution, use, monitoring). NRClick helps public authorities to achieve their goals – mandatory or not – regarding energy efficiency. This programme is divided in three complementary sections:

- an energy accounting tool, NRClick Scan;
- a service that allows public authorities to access interesting contracts regarding energy purchase and works of energy efficiency improvement;
- support in the organisation and monitoring of works of energy efficiency improvement.

2.II.v. *Financial instruments and incentives for existing buildings*

A Green Loan, with a 0-2% rate, can be obtained for renovation works in residential buildings for insulation, ventilation or for a performant heating system. More information is available at www.maisonenergiehuis.be.

Since 2004, energy premiums are given for renovation works on insulation, mechanical ventilation, performant heating systems and thermal regulation. The premium level is defined based on the income of the applicant and the type of building (single-family house, multi-family house, non-residential/industrial).

Financial year energy premiums	Number of premiums granted	Amounts granted
2004	1,840	€ 160,200
2005	15,419	€ 1,767,486
2006	18,381	€ 3,797,638
2007	15,126	€ 10,399,637
2008	16,489	€ 15,658,545
2009	25,951	€ 34,267,573
2010	16,652	€ 11,441,477
2011	19,526	€ 14,862,834
2012	13,787	€ 12,354,840
2013	15,169	€ 22,370,360
2014	15,528	€ 23,588,272
2015	17,345	€ 20,022,273
TOTAL	191,213	€ 170,691,135

Table 3: Subsidy for energy efficiency improvements in buildings.

Since 2007, the Brussels-Capital Region calls for exemplary projects in order to enhance and support renovations and new constructions. The purpose is to demonstrate that it is possible to achieve high performing and environmentally friendly buildings within a reasonable budget. Overall, the calls for projects launched between 2007 and 2013 have seen 243 projects being selected (for a total of 621,000 m²). These projects will all be completed by 2017 at the latest, with a financial support of 33 million € from the Region.

2.II.vi. Information campaigns / complementary policies

Multiple campaigns were run during the first half of 2016. A first campaign regarding inspection of heating systems was launched to promote the advantages of complying with the mandatory inspection. The chosen angle of this campaign was to show the impact heating systems have on the environment. This campaign was broadcasted on the radio and through colourful posters displayed in public places (subways, bus stops, bars) (Figure 1).



Figure 1. Information campaign for citizens about the mandatory control of boilers.

A second campaign regarding certification was launched shortly after. The aim of this next campaign was to convince the public that the EPB certificate is not just an administrative burden but that it contains very useful information for whoever intends to buy or rent a building unit. The message was “before buying or renting a good you should check what it has under the hood”. As for the first campaign posters were displayed in public places (Figure 2).



Figure 2. Information campaign for citizens on the need for the Energy Performance Certificate prior to sale or renting.

2.III. Energy performance certificate requirements

2.III.i. Progress and current status on sale or rental of buildings and EPCs

A complete update of the various systems in place for some years has been carried out:

- An updated calculation method has been published in October 2016 for houses and apartments, together with the development of an improved methodology and new software incorporating cost-effective recommendations.
- A new EPC template, more attractive and clearer, was created for houses and apartments, and this layout has also been applied in 2017 for EPC templates to be used for offices.
- New software and an enhanced methodology for public buildings has been developed in early 2017.

2.III.ii. Quality Assurance of EPCs

Controls on the quality of EPCs continue. Despite communication around frequently made mistakes and modifications carried out on the software, there was no dramatic enhancement to EPC quality.

A mandatory training for updating the knowledge has therefore been planned for already approved experts. They must have attended this training and passed the subsequent exam before mid-2018 in order to keep their accreditation.

2.III.iii. Progress and current status of EPCs on public and large buildings visited by the public

In mid-2015, the area threshold for which buildings occupied by public authorities must display an EPC was decreased to 250 m².

2.III.iv. Implementation of mandatory advertising requirement - status

The information required in mandatory advertisements is energy consumption in kWh/(m².year), CO₂ emissions and energy class.

The mean compliance rate of announcements with the required information increases from year to year; however, by the end of 2016, it was limited to about 60%. By the end of 2016, a large control campaign with zero tolerance began in order to quickly reach a rate of 100% compliant ads.

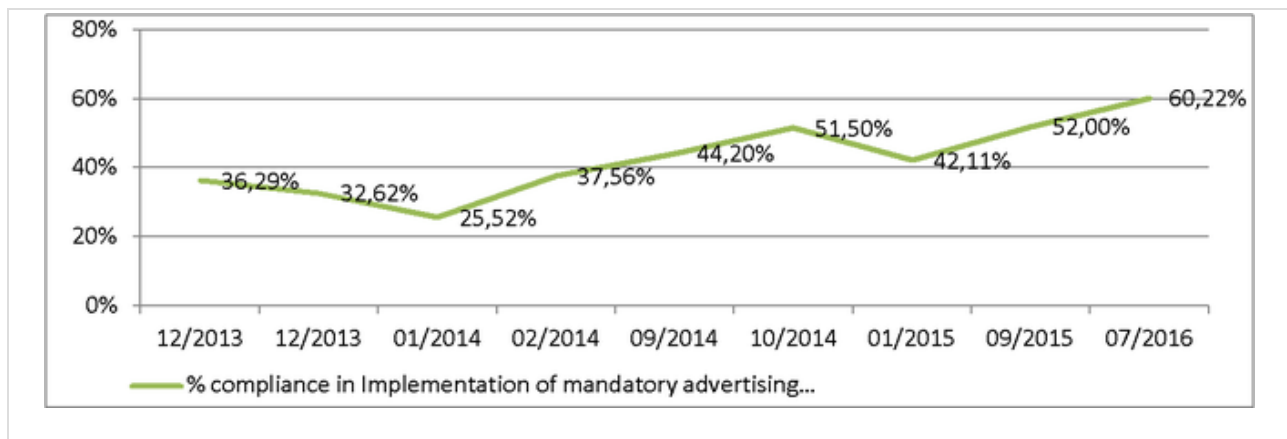


Figure 3. Percentage of real estate advertising with the required information about EPC.

2.IV. Inspection requirements - heating systems, air conditioning

The Brussels Capital Region has adopted the inspection option for heating and AC systems.

2.IV.i. Progress and current status on heating systems

A regulatory review is underway to integrate technological and regulatory developments, improve harmonisation with regulations in the other two Regions and take account of experience in this area; this work should be finalised in 2017. Moreover, since January 2015, the administration has a new database to follow up the inspection reports.

2.IV.ii. Progress and current status on AC systems

In 2016, training courses have been organised for professionals wishing to have the approval necessary to carry out the inspection of AC systems.

2.IV.iii. Enforcement and impact assessment of inspections

Quality control of inspection reports

One hundred and forty-seven (147) inspection reports (heating systems) were controlled by a licensed inspection body in 2016. It appears from this check that some of the certified technicians do not complete the inspection reports correctly. In 2017, the development of a computer application has been planned to help technicians in conducting inspections and report writing.

3. A success story in EPBD implementation

In Brussels, the Passive House standard was adopted as the building code in 2015, making it the first region in the world to require such a stringent standard. Recognised then as a leader regarding high-performance building standards, Brussels representatives were invited to New York to show the world what Brussels has to offer in that area during the Brussels Days 2018⁹. Ten years after this Brussels dedicated event, a new Ice Box Challenge will be organised in the New York City. This new challenge is intended to demonstrate the performance (with no energy added) of a highly efficient envelope.

New York City and Brussels, while on different continents and of different sizes, share a common vision. They want to advance their community towards a sustainable and renewable future through ambitious energy saving goals and programmes. Recognising the two cities' expertise, New York City and Brussels aim to further enhance their exchange of knowledge and provide support to each other. Together, these two cities, as well as with cities from around the world, will continue to be leaders in taking climate action and paving the way for a more sustainable future for our children and environment.

4. Conclusions, future plans

With the experience gained every day through the operational implementation of the different parts of the EPBD legislation, the stakeholders acknowledge more and more the importance of fixing ambitious requirements and of laying bridges between the different acts provided by the EPBD legislation, the methods of calculation included in the legislation and the data that is generated.

Endnotes

1. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0031&from=EN>
2. E-level is the annual primary energy consumption divided by a reference consumption.
3. K-Level is a function of the average U-value of the building envelope weighted by areas and correlated with compacity.
4. www.ejustice.just.fgov.be/doc/rech_f.htm
5. www.environnement.brussels/thematiques/batiment/la-peb/construction-et-renovation/legislation
6. www.environnement.brussels/thematiques/batiment/la-peb/construction-et-renovation/documents-utiles
7. A unit is considered as new when construction and/or demolition-reconstruction works exceed 75% of the area of loss including the placement and/or replacement of all technical installations
8. <https://nrclick.be/nrclick>
9. <http://brusselsdays.brussels>



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