EPBD implementation in Belgium
Brussels Capital Region
STATUS AT THE END OF 2012

1. Introduction

The implementation of the Energy Performance of Buildings Directive (EPBD) in Belgium is a regional responsibility. In the Brussels Capital Region, the EPBD is under the combined responsibility of the regional Ministry of Energy and the regional Ministry of Environment. At the end of 2012, they both have the same administration and the same Minister.

On the 7th of June 2007, the Government of the Brussels Capital Region adopted an ordinance transposing the EPBD into regional law. Some minor changes were introduced on the 14th of May 2009 and on the 3rd of February 2011.

This ordinance has been implemented through several executive orders adopted by the Government of the Brussels Capital Region or by the Minister of Energy.

A new set of energy demand requirements has been voted in May 2011 by the regional government, regarding individual dwellings, offices and educational buildings. These requirements shall come into force in January 2015.

The Brussels Capital Region has yet to transpose the recast EPBD. A new ordinance in progress, the Brussels Air, Climate and Energy Code, will be adopted in June 2013. This law reorganises and integrates the Brussels legislations in the air, climate and energy area, and will fully transpose the recast EPBD.

2. Energy performance requirements

2.1 Progress and current status

According to the Ordinance of the 7th of June 2007, the Energy Performance (EP) requirements are mandatory for buildings for which a building permit has been requested since July 2008. The applicable EP requirements are on primary energy consumption, insulation level, ventilation rate, overheating, technical installation, etc., and depend on the building type.

Since July 2008, the requirement concerning the K-level was tightened, and other requirements were added (E-level, insulation performance of walls and roof, minimum ventilation ratio, requirement on technical installations). These requirements are different for new buildings, major or simple retrofits, or existing buildings.

E-level is an EP level expressed as the fraction of primary energy consumption (for heating, hot water production, auxiliary equipment and cooling, plus lighting in the case of offices, from which the production from the cogeneration and solar panels, if any, is subtracted), by an expression including the area of the building envelope with thermal losses, the volume, the ventilation rate and, in the case of offices, the usable floor area and a variable for lighting.

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National Websites
2.2 Format of national transposition and implementation of existing regulations

The calculation procedure is defined in an executive order published on the 5th of May 2011. The method is similar to those established in the Flemish and the Walloon Regions. A study to revise and extend the calculation procedure for cooling and overheating has been completed. The results of this study are being incorporated into the calculation procedure (2012-2013).

The calculation method for primary energy already includes the input of Renewable Energy Sources (RES), such as solar energy (thermal and photovoltaic), biomass heating, geothermal heating and heat pump systems, as well as passive cooling techniques.

An integrated calculation tool with 3D construction graphical views, product databases and administrative forms has been developed in collaboration with the Walloon Region, and has replaced the previous software tool in July 2011. This last version integrates the new calculation procedure (on the 5th of May 2011) and takes into account the constructive nodes (including thermal bridges).

| Table 1: K-level and E-level required for new buildings. |
|---|---|---|---|---|
| Individual dwellings | 55 | 40 | - | 90 |
| Offices | 55 | 45 | - | 90 |
| Schools | 55 | 45 | - | 90 |

The E-level for residential units is calculated as follows:

\[
E = \frac{12}{A_v} \left( E_{p,heat,n} + E_{p,water,n} + E_{p,auxil,n} + E_{p,cool,n} - E_{p,photovoltaic,n} - E_{p,geogas,n} \right) (MJ)
\]

\[
E_{p,heat,n} = 115 \times A_v + 70 \times V_{ref} + 105 \times \dot{V}_{ref} (MJ)
\]

with:
- \( A_v \): Area with losses (m\(^2\))
- \( V_{ref} \): Volume (m\(^3\))
- \( \dot{V}_{ref} \): Ventilation flow rate (m\(^3\)/h)

K-level is a function of the average U-value of the building envelope weighted by areas and correlated with compacity (see requirements in Table 1):

\[
K = 100 \frac{U_m}{U_{m,ref}}
\]

With:
- \( U_m \): \( \frac{H_v}{A_v} \) [W/m\(^2\)K]
- \( H_v \): Thermal transfer coefficient [W/K]
- \( A_v \): Area with losses (m\(^2\))
- \( \text{Compacity} = \frac{\text{building's volume}}{\text{thermal loss surface}} \)
- \( U_{m,ref} = 1 \) if Compacity \( \leq 1 \) m
- \( U_{m,ref} = \frac{C + 2}{3} \) if 1 m \( \leq \) Compacity \( \leq 4 \) m
- \( U_{m,ref} = 2 \) if 4 m \( \leq \) Compacity

Table 2: Requirements for new buildings as from January 2015.

<table>
<thead>
<tr>
<th>Heating needs [kWh/m(^2)-year]</th>
<th>Cooling needs [kWh/m(^2)-year]</th>
<th>Primary energy consumption [kWh/m(^2)-year]</th>
<th>Overheating (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual dwellings</td>
<td>15</td>
<td>45</td>
<td>(time &gt; 25 °C) &lt; 5%</td>
</tr>
<tr>
<td>Offices and schools</td>
<td>15</td>
<td>15</td>
<td>90 - 2.5 \times \text{compacity}</td>
</tr>
</tbody>
</table>

*Compacity is the ratio: building volume / thermal loss surface
The Qualified Experts (QEs) designated to follow up new buildings and major renovations are called EPB-advisors. This accreditation is accessible only to architects and engineers, who have to attend a specific training programme, to obtain a certificate of competency, and to request an accreditation by the IBGE-BIM. The training is organised by independent training centres. At the end of 2012, 4 centres and about 702 EPB-advisors are accredited. In 2011, EPB-advisors were able to follow an additional training, in order to learn how to take thermal bridges into account, and how to use the new software.

The enforcement of small renovations (not falling under the definition of major renovations) is directly handled by the municipalities. Major renovations and new buildings are handled by the IBGE-BIM.

Quality Assurance (QA) system
The independent quality control of EPB-advisors started in March 2012. Thirty EPB-advisors have been checked so far. This first control did not have aim at imposing penalties; it was designed to get feedback on the work of the EPB-advisors in the market. The results are positive. Currently, the control of the EPB-advisors’ work is performed entirely by the IBGE-BIM.

2.3 Cost-optimal procedure for setting EP requirements
The cost-optimal study is in progress. The final report is expected in June 2013. The study will check both the current and the 2015 EP requirements.

2.4 Action plan for progression to NZEB
The new requirements coming into force in January 2015 specify that, in case of a renovation of more than 75% of the building envelope with heat losses and a respective change of technical installations, the maximum energy needs for the building after the renovation cannot exceed 120% of the requirements for a new building.

A new requirement of airtightness of 0.6 air changes per hour at 50 Pa will be voted in 2013 by the Regional Government for individual dwellings, offices and educational buildings, and will come into force in January 2018.

The severe tightening of the new requirements is a first step towards Nearly Zero-Energy Buildings (NZEB), which will be compulsory in 2021 (2019 for public buildings).

The definition of NZEB included in the Brussels Air, Climate and Energy Code uses the definition given by the recast EPBD (2010/31/EU), i.e., “nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby”. The results of the cost-optimal study will be used to make this definition more specific.

3. Energy performance certificates

3.1 Progress and current status on sale or rental of buildings

New buildings
For new dwellings, offices and education buildings, an Energy Performance Certificate (EPC) is issued by the IBGE-BIM at the end of the EP certification process, based on the final EP declaration. Other types of buildings do not have to obtain an EPC when built. EPB-advisors are in charge of this EP declaration. This EPC has to be used for real estate transactions, in the same way as the EPCs issued for older existing buildings. Therefore, the layouts are very similar.

This EPC contains:

- the address of the building and possibly the ‘name’ of the building;
- a picture of the building;
- the expiry date of the certificate;
- the floors (or parts of the building) certified if the EPC does not cover the whole building;
- the identifying number of the certificate;
- the label (A’ to G) granted to the building (ranking based on consumption [kWh/m²·year], in accordance with the
CEN (EPBD)-standard: EN 15217);
> the consumption values per m² and the total annual consumption of primary energy in kWh/year, calculated using the EP software;
> the amount of CO₂ emitted annually per m², calculated using the EP software;
> E and K levels, calculated using the EP software;
> a statement of compliance with the energy and climate quality inside the building, checked for each requirement;
> the date of issuance;
> assignment (individual dwelling, office, school);
> the data of the EPB-advisor (name, address, phone, e-mail, number of registration).

The EPC for new buildings includes explanations, as well as a list of typical measures for improving the energy performance of the buildings. These standard recommendations relate to heating, Domestic Hot Water (DHW), ventilation, summer comfort, lighting and domestic appliances. These recommendations are not specifically identified for any particular building.

Certificates for new buildings are issued since the beginning of 2011. By the end of 2012, the IBGE-BIM had issued about 430 certificates.

**Existing buildings**

Executive orders determining the certification rules, the asset calculation procedure, the accreditation of QEs, and the accreditation of training courses, have been adopted in the beginning of 2011. They came into force on the 1st of May 2011 for dwellings and office buildings for sale, and on the 1st of November 2011 for dwellings and office buildings for renting. Buildings undergoing renovation are considered as existing buildings.

The EPC includes recommendations obtained from a list of typical measures for improving the energy performance of the building, but imposes no obligation for carrying out works in order to meet specific energy requirements. The reference values determining the energy label are the same as those for new buildings. For dwellings, the recommendations are automatically triggered by poor quality for each element of the dwelling.

The mandatory software to be used for issuing EPCs operates in combination with a central registry. This software has various Graphical User Interfaces, and allows the expert to input specific elements, such as special windows or complex skylights, with ease.

**Table 3:**
Reference values determining the EP for individual dwellings and office buildings in kWh/m²·year (primary energy - ep)

<table>
<thead>
<tr>
<th>Energy class</th>
<th>Office buildings</th>
<th>Dwellings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumption range [kWhEP/m²·year]</td>
<td>Consumption range [kWhEP/m²·year]</td>
</tr>
<tr>
<td>A-</td>
<td>from 1 to 0</td>
<td>from 16 to 30</td>
</tr>
<tr>
<td>A+</td>
<td>from 32 to 61</td>
<td>from 31 to 45</td>
</tr>
<tr>
<td>B+</td>
<td>from 62 to 93</td>
<td>from 46 to 62</td>
</tr>
<tr>
<td>B</td>
<td>from 94 to 124</td>
<td>from 63 to 78</td>
</tr>
<tr>
<td>B-</td>
<td>from 156 to 186</td>
<td>from 96 to 113</td>
</tr>
<tr>
<td>C</td>
<td>from 156 to 217</td>
<td>from 114 to 132</td>
</tr>
<tr>
<td>C+</td>
<td>from 218 to 248</td>
<td>from 133 to 150</td>
</tr>
<tr>
<td>D</td>
<td>from 249 to 279</td>
<td>from 151 to 170</td>
</tr>
<tr>
<td>D+</td>
<td>from 280 to 310</td>
<td>from 171 to 190</td>
</tr>
<tr>
<td>D-</td>
<td>from 311 to 341</td>
<td>from 191 to 210</td>
</tr>
<tr>
<td>E+</td>
<td>from 342 to 372</td>
<td>from 211 to 232</td>
</tr>
<tr>
<td>E</td>
<td>from 373 to 403</td>
<td>from 233 to 253</td>
</tr>
<tr>
<td>E-</td>
<td>from 404 to 434</td>
<td>from 254 to 275</td>
</tr>
<tr>
<td>F</td>
<td>from 435 to 527</td>
<td>from 276 to 345</td>
</tr>
<tr>
<td>G</td>
<td>over 527</td>
<td>over 345</td>
</tr>
</tbody>
</table>
The software also includes automatic controls on a comprehensive list of possible discrepancies, thus avoiding many possible mistakes.

As of November 2012, about 60,000 EPCs have been issued for houses and apartments. Also, about 3,000,000 m² of office buildings are covered by an EPC.

In order to avoid creating barriers regarding the entry into the certification market, there are no minimum requirements (diploma or experience) for participating to the training in order to become a QE. This allowed the development of tailor-made (short and long) training courses for all kinds of participants. Typically, the courses take 3 to 6 days. However, candidates must pass a mandatory exam before requesting their accreditation as QE. The ministry ensures that there is a similar level of difficulty for the exams in all training centres.

There are 2 types of QEs for existing buildings, depending on the certificate type:

> existing residential buildings for real estate transaction;
> existing non-residential buildings for real estate transaction.

All QEs have to follow a specific training programme, to obtain a certificate of competency, and to request an accreditation by the IBGE-BIM. The training is conducted by private training centers, according to the regulation rules. At the end of November 2012, 7 centres have been accredited, and there are about 1,200 registered QEs for residential and non-residential buildings, whose data can be found on the IBGE website.

The cost of an EPC ranges from about 200 € for a studio flat, to 500 € for a big house (VAT included).

**Quality Assurance system**

QEs have the obligation to maintain for at least 5 years all the data on calculations and all the evidence for the EPCs they issue, and to make these details available to the ministry upon demand.

The IBGE-BIM set up a Quality Assurance (QA) scheme. A private body was hired for a 6 months period in order to control QEs issuing EPCs for dwellings, and for improving the scheme. On a yearly basis, the overall amount of controls performed should correspond to a sample of 1% of the issued certificates.

The objective of the scheme includes control of administrative obligations, compliance of technical procedures, and possession of the required documentation (drawings, bills, photographs, etc.). The controllers execute desk audits, detailed interviews with the QEs and on-site controls. The final report of this QA exercise is due at the end of May 2013. Further similar objectives will be set every year.

Due to the lower number of issued EPCs for office buildings, the QA for these EPCs has been managed by the IBGE-BIM itself, often with the support of the issuing QE, before or during the issuance of the EPC. However, this could change soon.

Penalties may be imposed if relevant errors are discovered and confirmed. The first time, the license of the QE may be suspended for 45 days. After two suspensions, the IBGE-BIM can request the withdrawal of the accreditation. Fines for the QEs are not applicable.
3.2 Progress and current status on public and large buildings visited by the public

Since the 30th of June 2012, public bodies that occupy more than 1,000 m² in a building must display an EPC on the front door or in the main lobby of the building. The rules related to this certificate are defined in an executive order adopted by the Government of the Brussels Capital Region on the 27th of May 2010.

The executive order came into force in two phases, according to the category of the building being certified: phase 1 (a list of the buildings to be certified since the 1st of January 2011, and a list of those with an issued certificate since the 1st of July 2011), and phase 2 (a list of the buildings to be certified since the 1st of January 2012, and a list of those with an issued certificate since the 1st of July 2012). The building categories and the respective phases are the following:

- Offices: administrative and technical services, town halls and communal houses (phase 1).
- Buildings of Parliament, judicial courts and administrative courts (phase 2).
- Sport facilities: swimming pools and sports centres (phase 1).
- Schools: nurseries, schools, colleges, universities, etc. (phase 2).
- Culture and entertainment facilities: museums, theatres, cultural centres, libraries, media centres and similar services (phase 2).
- Health and other facilities: hospitals, health centres, nursing homes, rehabilitation and care centres for the elderly, and similar services (phase 2).

The certificate is based on consumption data for electricity and fossil fuels used for all purposes, based on meters or invoices and, where appropriate, on data on the on-site production of electricity. The data cannot be metered earlier than 24 months before the date of the certificate issuance, and has to cover a continuous period of 11 to 13 months. The EP indicator is calculated on the basis of the occupied floor area.

The certificate reflects the EP level of the public building, and places it on a scale of labels according to its category. The mean EP level for the building categories in the Brussels Capital Region is illustrated as a dotted line in the scale. In addition, the certificate displays the index of CO₂ emission, as well as other information, such as financial data, information on on-site production systems, recommendations selected from a list of typical cost-effective measures, and a histogram of the consumption over the last three years (fully completed after three years).

If the occupant is the owner of the public building, they have to install a meter for each energy source and for each building individually, within 24 months from the date on which the executive order came into force.

Table 4: Mean CO₂ emissions and energy consumption per building type.

<table>
<thead>
<tr>
<th>Category of building</th>
<th>Mean CO₂ emissions [kgCO₂/m².year]</th>
<th>Mean consumption [kWh/m².year]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Administrative and technical services</td>
<td>60</td>
<td>418</td>
</tr>
<tr>
<td>2 Town halls and communal houses</td>
<td>60</td>
<td>440</td>
</tr>
<tr>
<td>3 Buildings of parliament, judicial courts and administrative courts</td>
<td>60</td>
<td>323</td>
</tr>
<tr>
<td>4 Nurseries</td>
<td>60</td>
<td>390</td>
</tr>
<tr>
<td>5 Schools, colleges</td>
<td>40</td>
<td>230</td>
</tr>
<tr>
<td>6 Technical and evening schools</td>
<td>40</td>
<td>250</td>
</tr>
<tr>
<td>7 Universities, high schools</td>
<td>40</td>
<td>270</td>
</tr>
<tr>
<td>8 Museums, theatres, cultural centres</td>
<td>60</td>
<td>310</td>
</tr>
<tr>
<td>9 Libraries, media centres and similar services</td>
<td>60</td>
<td>310</td>
</tr>
<tr>
<td>10 Hospita; healthy centres</td>
<td>60</td>
<td>327</td>
</tr>
<tr>
<td>11 Nursing homes, rehabilitation and care centres for the elderly</td>
<td>80</td>
<td>450</td>
</tr>
<tr>
<td>12 Swimming pools</td>
<td>1,200</td>
<td>7,375</td>
</tr>
<tr>
<td>13 Sports centres</td>
<td>80</td>
<td>468</td>
</tr>
<tr>
<td>14 Other</td>
<td>40</td>
<td>286</td>
</tr>
</tbody>
</table>
The certificate is to be issued by a QE using the relevant software, and applying the protocol provided by the IBGE-BIM. The executive order determining the rules for the accreditation of QEs and the accreditation of training courses was adopted on the 17th of February 2011. The training is conducted by private training centres, according to the regulation rules. At the end of November 2012, 3 centres are accredited, and there are about 80 registered QEs for public buildings, whose data can be found on the IBGE-BIM website.

3.3 Implementation of mandatory advertising requirement – status

As the EPC aims at informing the potential buyer or tenant of the EP level of the building, it has to be issued before the real estate transaction takes place, and before any advertising, and must be available to the potential buyer or tenant. Therefore, the original 2007 Ordinance already states that the reference values shall appear clearly on all advertisements. These reference values are currently the energy class, the EP [kWh/m²·year] and the CO₂ emissions.

A lot of contacts with major and minor real estate agencies, as well as with owner unions, made the compliance with the requirements possible in most cases of advertising. After some years of performing campaigns, fines are foreseen to start being levied in 2013 for those who will not comply with these rules.

Beyond advertising, there is also an obligation to obtain a valid EPC at the time that the building (residential or non-residential) is sold or rented. To ensure law enforcement, the administration agreed with the notary association on the obligation to report every real estate transaction for which a valid EPC is not available.

3.4 Information campaigns

Advertising campaigns on the radio, in the press, with banners on the administration website, etc. are foreseen for 2013, in order to encourage certification and boiler inspection. In addition, professionals will be informed through newsletters and specific seminars, in collaboration with professional associations. A lot of information is available on the IBGE-BIM website.

4. Inspection requirements - heating systems, air-conditioning

4.1 Progress and current status on heating systems

Since the 1st of January 2011, heating systems must meet a series of requirements that aim at the minimum acceptable energy efficiency level and at the reduction of the environmental impact of these systems. To ensure compliance with these requirements, the regulations require various inspections to be carried out by QEs. These requirements and actions are determined in the Executive Order of the Government of Brussels Capital Region of the 3rd of June 2010, concerning the requirements for the heating systems of a building during installation and operation.

The executive order applies to all heating systems in the Brussels Capital Region territory, which include one or more boilers with the following characteristics:

> with a nominal power above 20 kW;
> operating on liquid or gas fuel; and
> with hot water as the heat transfer fluid.

The heating system is the set of components necessary to heat the air in a building and/or the DHW, including one or more heat generators, distribution lines and storage tanks, and the terminal units for heat exchange (radiators, convectors, etc.), as well as control systems. A heating system is of Type 1 if the heat is produced by a boiler with a nominal output equal to or lower than 100 kW, and of Type 2, if the heat is produced by a boiler with a nominal output greater than 100 kW, or by more than one boilers.

The executive order contains 16 requirements concerning the following points:

1. the holes for measuring the combustion efficiency;
2. the combustion efficiency and emissions of boilers in operation;
3. the sizing of the boilers;
4. the modulation of the power of boiler burners;
5. the chimney draft;
6. the ventilation of the boiler room;
7. the tightness of exhaust gas and combustion air supply ducts;
8. the insulation of pipes and accessories;
9. the partitioning of heating and air distribution;
10. the control of the heating system;
11. the logbook;
12. the energy metering of boilers;
13. the energy metering of electric fans;
14. the heat recovery of exhaust air;
15. the variation of the flow of fresh air;
by actual occupation (for spaces with variable occupation);
16. the energy accounting (measuring, analysing and reporting the energy consumption of the heating system).

Acceptance tests of heating systems with new boiler(s)
The system owner must hire a QE to perform an inspection of the entire heating system during its commissioning, in anyone of the following cases:

> after installing the boiler;
> after replacing the boiler body;
> after replacing the burner;
> after moving the boiler.

The purpose of the approval is to verify the system compliance with the legal requirements, including all the points in the previous list. This type of inspection is named ‘reception’ of heating systems.

At the end of the acceptance tests, the QE completes a report. The original is given to the system owner, and a copy is sent to the IBGE-BIM; the QE keeps another copy. The minimum contents of this report are legally fixed.

Periodic inspection of boilers
The owner of the heating system has to hire a qualified technician to maintain and check the boiler every year for oil boilers, and every 3 years for gas boilers. This type of inspection is named ‘periodic inspection of boilers’ and follows a formal methodology, unrelated to the CEN standards. This inspection shall include the following items:

> cleaning of the boiler;
> cleaning the exhaust system of combustion gases;
> adjustment of the boiler burner;
> verification of the following requirements:
  • presence of holes for measuring the combustion efficiency;
  • combustion efficiency and emissions of the boiler in operation;
  • power modulation of boiler burners;
  • chimney draft;
  • ventilation of boiler room;
  • tightness of the exhaust gas and combustion air supply.

At the end of the ‘periodic inspection’, the qualified technician completes a report. The original is given to the system owner, and the inspector keeps a copy. If the boiler does not comply with the legal requirements, the inspector sends a copy of the report to the IBGE-BIM. The minimum content of this report is legally fixed.

One-off inspections of heating systems
The one-off inspection of a heating system is an assessment of the whole system by a QE. It must be performed not earlier than one year before and not later than one year after the oldest boiler, with a power greater than 20 kW, that is connected to the heating system has reached the age of 15 years. A periodic inspection shall have to be conducted within 12 months prior to this one-off inspection. The one-off inspection includes:

> assessment of the EP of the boilers and the heating system;
> information regarding compliance with applicable requirements, depending on the type of the heating system;
> assessment of the oversizing of the boilers;
> advice on:
  • boiler replacement;
  • other possible changes to the heating system;
  • the use of the heating system;
  • alternative solutions.

The method and tools for the one-off inspection were developed in collaboration with the Flemish and Walloon Regions. Different tools are used depending on the type of the heating system (Type 1 or Type 2). For Type 1 systems, a calculation device is used. For Type 2 systems, a specific software programme was developed.
Table 5: Types of Qualified Experts, depending on the type of heating system and type of inspection for which they are authorised.

<table>
<thead>
<tr>
<th>Type of inspection</th>
<th>Type of heating system</th>
<th>Type of qualified expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reception</td>
<td>Type 1</td>
<td>Certified heat engineer</td>
</tr>
<tr>
<td></td>
<td>Type 2</td>
<td>EP heating advisor</td>
</tr>
<tr>
<td>Periodic inspection</td>
<td>Type 1 &amp; 2</td>
<td>Certified boiler technician L, G1, G2</td>
</tr>
<tr>
<td>One-off inspection</td>
<td>Type 1</td>
<td>Certified heating engineer</td>
</tr>
<tr>
<td></td>
<td>Type 2</td>
<td>EP heating advisor</td>
</tr>
</tbody>
</table>

Qualified Experts for carrying out boiler Inspections
There are 5 types of QEs, depending on the inspection type and the boiler type:

- the certified boiler technician L (oil boiler);
- the certified boiler technician G1 (atmospheric gas boiler or premix burner);
- the certified boiler technician G2 (gas boiler with forced air burner);
- the certified heating engineer;
- the EPB heating advisor.

The accreditation by the IBGE-BIM is subject to certain conditions, including obtaining a certificate of competency after attending a training course and passing an exam on the regulation and the techniques (depending on the type of accreditation), complying with certain obligations (e.g., keeping copies of the reports, accepting the quality control, using the methodologies and the tools supplied by the IBGE-BIM, etc.) and attending follow-up refresher training. The accreditation is valid for 5 years, and may be extended for additional periods of 5 years.

The IBGE-BIM has provided a specific syllabus with the content of the training (including the exam). They are available free of charge on the IBGE-BIM website or on demand. The trainings are organised by independent training centres since the beginning of 2011.

In November 2012 there were about:

- 360 certified boiler technicians L;
- 500 certified boiler technicians G1;
- 150 certified boiler technicians G2;
- 150 certified heating engineers;
- 50 EPB heating advisors.

Quality Assurance system
The quality control of the certified boiler technicians, the certified heating engineers and the EPB heating advisors has started, but it is still in the first phase. It is still more of a 'coaching' than a punitive control. However, if necessary, the IBGE-BIM can suspend or revoke the license of a QE (in case of repeated non-compliance with the obligations).

4.2 Progress and current status on AC systems
The regulation on the energy performance of air-conditioning (AC) systems aims at the minimum acceptable energy efficiency level, and the reduction of the environmental impact of these systems. It came into force on the 1st of September 2012. This regulation determines:

- a series of requirements (see below);
- a minimum maintenance programme;
- a periodic inspection.

According to the energy balance of the Brussels Capital Region, AC, ventilation and refrigeration represent 8% of the electricity consumption in the tertiary building sector. About 50% of the commercial buildings have AC systems; this percentage rises to 70% in private offices. The regulation on the energy performance of AC systems should allow a reduction of 5 to 10% of the energy consumption of these technical facilities.

This regulation applies to AC systems with an effective rated output greater than 12 kW. This effective rated output is the sum of the cooling capacity of refrigeration systems that make up the AC system, and are connected to a common control.

The EP requirements concern the following points:

- sizing of the refrigeration plants;
- thermal insulation of pipes and accessories;
- partitioning of cold and air distribution;
- energy metering on the refrigeration plant;
- energy metering on the electric fans;
- variation of the flow of fresh air according to the actual occupation (for spaces with variable occupation);
- energy accounting (measure, analyse and report the energy consumption of the AC system);
- keeping a logbook.

Maintenance
AC systems need to be maintained in accordance with a minimum maintenance programme to be determined in a ministerial executive order. Once this
order is in force, and after a transition period, this maintenance will have to be performed under the supervision of a technician accredited by the IBGE-BIM.

**Periodic inspection**
AC systems must be checked periodically by an inspector accredited by the IBGE-BIM.

The first periodic inspection must be completed by the 1st of September 2013. The maximum interval between two consecutive inspections depends on the effective rated output of the AC system, as presented in Table 6.

In addition, after installing a new AC system or after a significant modification, a periodic inspection must be carried out. The periodic inspection includes:

> evaluation of the sizing of the AC system;
> verification of control parameters such as temperature setpoints and operating schedules;
> verification of system maintenance;
> verification of compliance with the EP requirements;
> recommendations for improvements and corrections to the existing AC system and, if necessary, advice on replacement and on alternative solutions.

At the end of the 'periodic inspection', the inspector completes a report using the software supplied by the IBGE-BIM. The original is given to the system owner, a copy is sent to the IBGE-BIM and the inspector keeps another copy for their archives. The minimum contents of this report are legally fixed.

**Qualified Experts for carrying out AC systems inspections**
There are 2 types of QEs for carrying out AC system inspections: EPB air-conditioning technician, and controller.

<table>
<thead>
<tr>
<th>Effective rated output of the AC system</th>
<th>Maximum interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 12 to 100 kW</td>
<td>15 years</td>
</tr>
<tr>
<td>≥ 100 kW</td>
<td>5 years</td>
</tr>
</tbody>
</table>

The EPB air-conditioning technician is responsible for the maintenance supervision, while the controller performs the periodic inspections.

The accreditation by the IBGE-BIM is subject to the same rules described for boiler inspectors.

**Quality Assurance system**
The regulation foresees a quality control, but it has not been implemented yet.

5. Conclusions and future plans

Before the Energy Performance of Buildings Directive (EPBD), the only energy requirement for a new building was to get a K-level (average U-value of the building envelope, weighted by compacity) of 55, and to have the liquid fuel boilers maintained by an accredited professional each year. Following the EPBD, the K-level was tightened, and additional requirements and controls were introduced, as described in this report. The Energy Performance Certificates (EPCs) have also been introduced.

**Future plans**
The following steps are under way:

> finalisation of the last executive or ministerial orders required for the certification of existing buildings and the inspection of AC systems;
> training and accreditation of the Qualified Experts (QE) to perform heating system inspections and certifications;
> revision of the calculation procedure for new buildings;
> upgrade of the software tool for the Energy Performance (EP) calculation for new buildings;
> new efficient software tool for the EP calculation for public buildings;
> enhancement of controlling the enforcement of the regulation for the Energy Performance Certificates (EPCs);
> transposition of the recast EPBD, including planning for Nearly Zero-Energy Buildings (NZEB).
Co-funded by the Intelligent Energy Europe Programme of the European Union

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