1. Introduction

In Hungary, most of the articles of the Energy Performance of Buildings Directive (Directive 2010/31/EC, EPBD) were implemented between 2012 and spring 2014. For buildings that receive any public funding, the energy performance requirements were upgraded to the cost-optimal level at the beginning of 2015. The cost-optimal requirements will only be introduced as mandatory requirements in 2018, whereas Nearly Zero-Energy Building (NZEB) requirements will come into force in 2019 and 2021 for public buildings and all new and majorly renovated buildings respectively. At the end of 2014, the National Building Energy Strategy is in the phase of open discussion, envisaging very ambitious renovation goals until 2020 and in particular, an exemplary role for public buildings. Since 2013, the registration and the quality control of the Energy Performance Certificates (EPCs) have been conducted on an electronic basis, resulting in a remarkable increase in the number of certificates issued annually. Hungary has adopted alternative measures for inspection of heating and air-conditioning (AC) systems and thus several support programmes have been in operation over the recent years. Information campaigns have been carried out with special attention to cost-optimal renovation solutions.

2. Current status of Implementation of the EPBD

I. ENERGY PERFORMANCE REQUIREMENTS

I.i. Progress and current status

The first Ministerial Order to transpose the Directive 2002/91/EC (7/2006. (V. 24) Decree about Determination of Energy Efficiency of Buildings) was issued in May 2006 and was in force between 1 September 2006 through 31 December 2014. This order included the requirements, the design input data and the calculation method. The requirements have changed from the beginning of 2015 onwards. Although the requirements generally did not change between 2006 and 31 December 2014, there were a few exceptions:

> new requirements for the building service systems and minimum requirements for building elements and system elements in case of non-major renovations were put into force on 9 January 2013;
> in 2012 and in April 2014, slight modifications were introduced in the calculation procedure;

AUTHORS

Tamas Csoknyai,
Budapest
University of Technology and Economics

Ilona Soltész,
Ministry of Interior

András Zöld,
University of Debrecen

NATIONAL WEBSITE www.e-epites.hu/energetikai-tanusitas-0
> from 30 January 2015, the scope of the above mentioned decree became wider: monuments, and some agricultural buildings are also subject to the requirements.

The minimum energy requirement for new buildings is equivalent to an EPC class C rating.

The Decree of the Minister of Interior 40/2012 (VIII.13) has introduced new requirements for building service systems and minimum requirements for building elements and system elements in case of non-major renovations. The decree has been in force since 9 January 2013. The following Decree of the Minister of Interior 20/2014 (III.7) introduced new cost-optimal requirements from the beginning of 2015 for buildings that receive public funding and for any construction projects financed by the state budget. The same requirements will be generally introduced for all buildings (with exceptions allowed by the EPBD) at the beginning of 2018. The same decree lays down the definition and requirements of NZEB to be introduced in 2019 for public buildings and in 2021 for all new buildings and those undergoing major renovations.

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

The requirement system has three facets, as far as new buildings and major renovations are concerned. Maximum permitted U values are set for elements and specific heat loss coefficient (W/m².K), as function of the surface to volume ratio. The losses from thermal bridges (with the simplified or detailed procedure) and the effects of shading devices are also considered. Finally, the specific yearly primary energy need must not exceed a limit, which depends on the surface to volume ratio and the type of use of the building. Maximum permitted values are given for a few typical uses (residential, school, office), whilst in the case of mixed use, a reference building is to be considered.

The primary energy needs include heating, Domestic Hot Water (DHW), cooling and, for non-residential buildings lighting needs. Airtightness measurements are not required, but the quality of windows is examined visually by experts on the site and the estimated infiltration is taken into account in the calculation. For new buildings and major renovations, thermal comfort and minimum requirements on fresh air supply are set, but these values are not considered in the calculation procedure for certification. The calculation procedure refers to several European standards (see Figures 1 and 2).

The most detailed and comprehensive technical guidance document for energy experts is the book ‘Building Energetics’ (Zöld, A. and others. Building Energetics, 2009. ISBN: 978-963-7298-31-8; see Figure 3). This book is a step-by-step guide for professionals including the legislative background, the calculation process of the asset method, the certification process and analysis of existing buildings. As this book is already partly outdated, the Ministry of Interior has issued a technical guidance document. The most up-to-date version is available online[1].

Figure 1: The specific heat loss coefficient (W/m².K) before (pre-EPBD) and after 2006 (in force until the end of 2014) and the cost-optimal requirements that were introduced in 2015 for buildings receiving public funding. It will apply to all buildings in 2018. The foreseen NZEB requirements for the specific heat loss coefficient is identical to the cost-optimal requirement.

Other relevant documents can be found online[2] including a manual for cost-optimal renovation. The www.e-epites.hu website is one of the official portals for the EPBD implementation in Hungary. The other official portal www.lakcimke.hu is operated by the ‘Energiaklub’ Climate Policy Institute and Applied Communications, and contains guidance information for citizens and end users (see Figure 4).

I.iii. Cost-optimal procedure for setting energy performance requirements

The cost-optimal calculations have been carried out according to the common EU methodology framework issued by the 244/2012 Order on the basis of Directive 2010/31/EC. The detailed calculation is available at the ‘e-epites’ website[3]. The procedure has proved that the current requirements are sub-optimal, therefore new requirements were introduced in 2015 for buildings receiving public funding, and in 2018 for all buildings. The application of most of Renewable Energy Sources (RES) has not proved to be cost-optimal. The cost-optimal requirements are laid down in the Decree of the Minister of Interior 20/2014 (III.7). It is worth mentioning that the energy prices in the Hungarian residential sector have decreased since the cost-optimal procedure has been prepared (see Table 1 and Figures 5 and 6).

I.iv. Action plan for progression towards Nearly Zero-Energy Buildings (NZEBs)

National application of the NZEB definition

The general national targets for NZEBs are set in the ‘2nd National Energy Efficiency Action Plan until 2016 with an outlook to 2020’ (NEEAP) ratified by the Governmental Decree 1374/2011 (XI.8). According to this decree, the National Building Energy Strategy has to be developed by the Ministry of National Development. The development of this strategy was at the phase of open consultation at the end of 2014. The government decided on 3 February 2012 that the NZEB requirements shall only come into force in 2019 and 2021 respectively. As an intermediate step, the cost-optimal requirements that are already defined by the legislation will be introduced in 2015 and 2018.

Figure 2: The 2006-2014 and 2015 cost-optimal requirements for the specific yearly primary energy need. The foreseen NZEB requirements will be 25% lower than the cost-optimal (not indicated on the diagram).


According to the Decree of the Minister of Interior 20/2014 (III.7) a NZEB is a building that meets the cost-optimal requirements and has 25% of its primary energy demand covered from RES, onsite or nearby. It is a brief definition that has to be further elaborated in the future in order to be applied in practice. Furthermore, the calculations of the cost-optimal levels for NZEBs will be further elaborated at a later stage, when the price levels of investment and operational costs become more predictable and therefore, more accurate. The level defined in the brief definition above might be modified in the future.

### Figures and statistics on existing NZEBs

There are no reliable statistics on the number of existing NZEB buildings. The Ministry of National Development has recently published a tender for a project to monitor the national building stock. The results are expected in May 2015.

According to the Hungarian Passive House Association, there are approximately 100-200 existing NZEBs. Most of them are single family houses or public buildings which have been renovated with the support of the Environmental and Energy Efficiency Operation Programme. Taking into account the usual construction trends, it is expected that by 31 December 2020, the number of constructed NZEBs will be between 10,000 and 30,000, of which 80% will be apartment buildings. It is predicted that the demand for low energy buildings will significantly increase between 2015 and 2020.

Within the existing NZEBs in Hungary, the prize-winning Solanova pilot NZEB project consists of an apartment building containing 42 units that has been retrofitted. The original building was built with

### Table 1: Maximum U values (W/m²·K) of building elements in 2014 and foreseen requirements of the cost-optimal and NZEB levels.

<table>
<thead>
<tr>
<th>Building element</th>
<th>2014 requirement</th>
<th>2015, 2018, 2019, 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed wall</td>
<td>0.45</td>
<td>0.24</td>
</tr>
<tr>
<td>Flat roof</td>
<td>0.25</td>
<td>0.17</td>
</tr>
<tr>
<td>Attic floor slab</td>
<td>0.30</td>
<td>0.17</td>
</tr>
<tr>
<td>Floor slab over basement</td>
<td>0.50</td>
<td>0.26</td>
</tr>
<tr>
<td>Window, non-metal frame</td>
<td>1.60</td>
<td>1.15</td>
</tr>
<tr>
<td>Window, metal frame</td>
<td>2.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Entrance door</td>
<td>3.00</td>
<td>1.45</td>
</tr>
<tr>
<td>Glazing</td>
<td>-</td>
<td>1.00</td>
</tr>
</tbody>
</table>

![Figure 5: Results of the cost-optimal calculations for different building types.](image)

![Figure 6: Renovation packages of a defined single-family house (1 € = 300 Ft).](image)
prefabricated reinforced concrete sandwich elements typical in Eastern-Europe between 1960 and 1990. After retrofit, the heating energy consumption achieved is under 40 kWh/m².year (see Figure 7).

The first steps for the implementation of the EED Articles 4 and 5 are laid down in the previously referenced NEEAP. Three percent (3%) of the total floor area of heated and/or cooled buildings owned and occupied by the central government are to be renovated each year. In order to finance this, European funds and the income from the CO₂ trade quotas will be used. The selection for the first 100 buildings to be renovated must be completed by the beginning of 2015.
The buildings owned and occupied by the central Government institutions, are defined in the Act No. CVI. of 1997 (Property of the State), and the Government Decree 152/2014. (VI.6 - tasks and awareness of the Government). The scope of the renovation of the public building stock will be much wider than that of the central government buildings. Many schools, nurseries, hospitals, police stations will be targeted for renovation projects in over the next couple of years. The estimated total floor area of public buildings is 1.9 million m². The renovation cost is about 76 billion Forints (253 M€) over 5 years.

II. REQUIREMENTS FOR TECHNICAL BUILDING SYSTEMS (TBS)

II.i. Coverage of heating, domestic hot water, air-conditioning and large ventilation systems
The requirements on heating, DHW, AC and large ventilation systems have been in force since the 9 January 2013. These requirements are partly recommended and partly obligatory (described in section II.v of this report). The requirements apply to new buildings, buildings undergoing major renovations and also for minor energy renovations. The requirements are set down by the Decree of the Minister of Interior 40/2012 (VIII.13). No further revision of the requirements for technical building systems is envisaged until 2020.

II.ii. Regulation of system performance, distinct from product or whole building performance
There are no specific requirements on the performance of building systems beyond those that apply from specific product quality standards. However, the building still has to achieve the minimum overall requirements which depend on the surface to volume ratio and the type of use of the building as stated in the previous chapter. This automatically sets some limits on the performance of the system, although in an indirect manner.
For minor renovations there are no requirements on the whole building performance, only on the system elements to be renovated or changed.

II.iii. Applicability to new, replacement and upgraded systems in existing buildings
If any building element or building service system element is to undergo an energy retrofit, the system element must fulfil the current requirements of the relevant elements. This rule does not apply in case of maintenance measures.

II.iv. Provisions for installation, dimensioning, adjustment and control
The requirements on heating, DHW, AC and large ventilation systems have been in force since 9 January 2013. These requirements cover the rules of installation, adjustment and control and must be applied to new buildings and for every new or replaced TBS only.
A part of the requirements is only a recommendation. In the application of condensing boilers and room-wise heating control systems, as well as in the case of a balanced ventilation system, it is suggested (or recommended) that the heat recovery efficiency be higher than 70%.

The other part of the requirements is obligatory. Thermal comfort (indoor air temperatures) and the indoor air quality (quantity of fresh air, maximum concentration of CO₂) should be based on the standard EN 15251. It is also obligatory to apply a central control system in buildings which have a heated floor area of over 100 m². The balancing of the heating, cooling, ventilation and DHW systems is required and must be proved by the verification of 10% of the valves.

The documentation of the hydraulic balancing and its verification is a part of the pre-conditions in the closure of the construction process. The circulation pumps must be operated according to a time schedule. The pressure drop losses are limited for ventilation system elements. The operation mode of the ventilation system and the airtightness of the ductwork are to be set according to the standard EN 13779 in order to optimise the fan power.

II.vi. Encouragement of intelligent metering

The introduction of an intelligent metering system is realistic only in the long term, regardless of the energy source (gas, district heat or electricity) and the building type. There are only experimental projects on the issue. A feasibility study about the applicability of intelligent metering in multi-family buildings was elaborated in 2011. The study has proved that there are significant technical difficulties to install intelligent (gas) metering units in many multi-family buildings, because the existing systems (particularly gas and heating systems supplied by district heating) are often centralised and the installation of the metering units would require the reconstruction of the distribution system. There are also conflicts about personal rights: users do not want that the service providers have a look on their consumption habits.

II.vii. Encouragement of active energy-saving control (automation, control and monitoring)

According to the new Hungarian legislation for new buildings and major renovations, it is obligatory to apply a central control system (weather compensation) in buildings which have a heated floor area of over 100 m² and circulation pumps must be operated according to a time schedule.

III. ENERGY PERFORMANCE CERTIFICATES (EPCs) REQUIREMENTS

Starting from January 2012, all existing residential and non-residential buildings need to be certified when sold. The owner must present a valid EPC to the buyer, when the sale contract is agreed upon. For rentals, the EPC is on a voluntary basis until 31 December 2015. From then on, the owner must present a valid EPC to the renter when a rental contract is agreed upon.

As of 2006, new buildings must reach at least an EPC class C rating. The same rule applies in the case of a major renovation of a building. If a new unit or wing is added to an existing building, there are two options: either the extension only, or the building as a whole, should meet the requirement. Such a retrofit or extension is subject to a building permit, which will be issued only if the required energy performance level can be demonstrated using the calculations.

EPCs are valid for 10 years unless the building undergoes a major renovation, in which case a new EPC is required.

The EPCs are issued by independent experts who have passed the exam at the Hungarian Chamber of Engineers or at the Hungarian Chamber of Architects.

The Governmental Decree 105/2012 (V. 24.), amendment of several governmental decrees on building affairs and territorial design, amended the Governmental Decree 176/2008 (VI. 30.) on the energy certification of buildings. In accordance with the Directive 2010/31/EC, the new legislation introduces the detailed rules of certification and the new rules for display of certificates in public buildings. The new legislation introduces a binding electronic registration, as well as the review and quality control system of EPCs.

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

Overview and administration system

Since mid-2014, the implementation of the EPBD is controlled by the Prime Minister’s Office, while the subsidy programmes and the strategic and operational programmes are managed by the Ministry for National Development.
Since January 2013, EPCs are registered in a central database operated by the Lechner Non-Profit Organisation. The database is partly public. Demonstrating this, a building’s energy performance class can be searched by its address. Statistical information from the database is also publicly available. The licences for the certified experts are issued by the Hungarian Chamber of Engineers and the Chamber of Architects. The Chamber of Engineers runs the control system of the EPCs.

**How flats are certified in apartment buildings**

Apartment units can be certified individually or, if the EPC is available for the whole building, this EPC can then be used for an individual unit as well. In most cases, the EPCs are issued for individual apartments.

**Format and content of the EPC**

The EPC assigns an energy performance label to residential and non-residential buildings or building units and it lists cost-effective measures for improving their energy performance. The energy label classifies the buildings on an efficiency scale ranging from A+ (high energy efficiency) to I (poor efficiency). The classification is based on the requirement of the specific yearly primary energy need. An example of an EPC is provided in Figure 8.

The practical benefit of the energy performance certification is found in the recommendations that are provided to the building owner. These are summarised on page 2 of the certificate. The suggestions include a short description of improvements specific to the proposed building and the impact on the energy rating, if all measures were to be implemented. The level of detail in the calculations depends on whether the owners of existing buildings are applying for a subsidy. In this case, evidence of the expected outcome of the retrofit in energy terms must be provided and, therefore, a more accurate survey and calculation is necessary to guarantee that the subsidy conditions will be satisfied. The EPCs must have an annex as well which describes the calculation details.

**EPC activity levels**

Up until the end of 2014, the number of EPCs registered in the electronic system is 201,134. The electronic system has been in use since January 2013. The estimated number of EPCs before the introduction of the electronic system was below 100,000 (this figure is not included in the number of EPCs registered in the electronic system). Most of the EPCs were issued in Budapest (71,017), 51,479 belonged to other large cities, 47,558 to small cities and 31,136 to villages.

**Typical EPC costs**

The cost of a certificate for an apartment unit is prescribed by the law (40 € + VAT per unit). The same price applies for single-family houses. This cost has often been criticised by experts as unrealistically low and it thus has a strong negative impact on the quality of the certificate. However, travel costs, measurement costs and data collection costs can be added to the above value (up to a maximum of circa 60 € + VAT per unit). For non-residential buildings, there is no legally prescribed amount on the cost of an EPC, but in practice, the certificate costs between 100 € and 1,500 € depending on the size and complexity of the building.

**Assessor corps**

The EPC electronic registration system is operated by Lechner Nonprofit Organization under the umbrella of the Prime Minister’s Office. Licences for independent EPC experts are issued by the Hungarian Chamber of Engineers and the Hungarian Chamber of Architects. These organisations are also responsible for the exams. The Qualified Experts (QEs) are mostly civil engineers, architects or mechanical engineers, but other engineers are also allowed to become QEs.
Long and detailed courses are regularly organised by universities and training institutions, but the exam can be taken without such a course via self-study. In addition to the obligatory exam, any member of the Hungarian Chamber of Engineers and the Hungarian Chamber of Architects has to attend regular short training programmes in order to keep their knowledge up-to-date. In these programmes the topic ‘building energy regulations’ is an obligatory element for all members of the chambers (not only for the QEs). The system is an efficient means to maintain constant interest towards lifelong learning.

At the moment there are approximately 2,500 registered experts. Half of them have already submitted at least one certificate to the online system and a quarter of them have submitted more than 5.

**Compliance levels by sector**

In the case of a new building, the EPC must be presented within 90 days of issuing the occupancy permit. If this is not done, the owner will be required to pay a penalty fee. The Building Authority has the right to compel the preparation of the missing EPC in these cases. The penalty can be repeated any time until the EPC is uploaded into the electronic database.

**Enforcement with building owners and real estate actors**

For building sales after 9 January 2013, lawyers are required by law to insert the registration code of the EPC generated by the electronic registration system into the written contract.

For rental of buildings or building units, the EPC is voluntary until the end of 2015, when it will then become compulsory.

**Quality Assurance (QA) of EPCs**

An EPC electronic registration system has been in operation since 9 January 2013. An EPC can be considered official only after uploading it to the online system. The EPC can be uploaded in two ways:

- manually inserting the set of input calculation data of the building, as well as the precalculated results (a set of output data) into the EPC registration system. The system is not a calculation tool, only a database with some automatic cross-checking modules;
- exporting the calculation results into a pre-defined xml format with any software available on the market (an exporting module can be included in the software or the data should be inserted manually).

The online system also serves as a first level of quality control. First, it automatically checks the permit of the energy expert. Following this step, the system checks for unrealistic figures.

The second and third control levels are performed by the Hungarian Chamber of Engineers. Two and a half percent (2.5%) of the EPCs are controlled by an office check and 0.5% (20% of the 2.5%) are verified on-site. Both actions are carried out by independent experts and all control results are registered on an electronic database.

If the quality control detects a miscalculation of a difference by more than two energy classes, the expert loses his licence for 3 years. This is the only possible penalty at the end of 2014, but the introduction of ‘softer’ penalties is under consideration.

Until the end of 2014 (test period), 3,757 EPCs altogether were checked and no penalties were applied. The share of incorrect EPCs is below 10%. The first sanctions are expected in the summer of 2015.

**III.i. Progress and current status on public and large buildings visited by the public**

**Overview**

The display campaign for public buildings started in 2009. The format and content is identical to other EPCs and is issued by the same QEs as any other EPC, but using operational rating is only allowed for the purposes of the display campaign. The energy classification is based on the yearly specific primary energy demand requirement.

In Hungary, the definition of a public building includes every state-owned non-residential building. Initially, only the larger buildings (exceeding 1,000 m² floor area) were required to display their EPC, making it visible to the public. Since 9 January 2013, the EPC is obligatory for public buildings and large buildings open to the public exceeding 500 m² floor area (after 2015, this limit will be decreased to buildings exceeding a 250 m² floor area) and the EPC must be displayed in a visible place. For the display itself, there is no control and sanction system in operation at the end of 2014.

The EPC is valid for a maximum of 10 years. It can be updated on a voluntary basis.
Activity levels
The number of EPCs currently on display is unknown, as only the number of electronically uploaded EPCs are registered on the system (see Figure 9).

Costs
The cost of an EPC for public buildings must be determined on the basis of real cost reports and generally is between 100 € to 1,500 €.

Quality Assurance (QA) of EPCs
The quality assurance of displayed EPCs is identical to other EPCs. However the public display itself is not checked.

III.iii. Implementation of mandatory advertising requirement
According to the Governmental Decree 176/2008 (VI.30), as of 9 January 2013, the energy categories must be displayed in all commercial advertisements for all buildings or building units, (including individual apartments in blocks of flats, single-family houses and non-residential buildings) when sold or rented, if the EPC is available. Individual apartments were exempted from this requirement until 1 June 2013. In most cases, the EPC is not available in the period of advertising, but only at the moment of sale or rental. As of January 2015, it is not controlled nor sanctioned if the mandatory advertising requirement is obeyed or not.

III.iv. Information campaigns
In the early stages of implementation in 2006, a very intensive information campaign was launched. Several TV and radio interviews addressed the general public, while workshops and open forums were available to the professional community. A webpage and an electronic guide gave updates on the correct interpretation of the directive and national regulations. Printed guides for architects and engineers, in addition to popular pocket guide books for housing associations were published (see Figures 10 and 11).

Later on, the emphasis of the campaign stopped addressing the professional community and focussed solely on providing information to the general public. The Energiaklub (NGO) created a home page (www.lakcimke.hu) where the basic concepts such as renewable energy, sustainability and certification, as well as everyday tips for saving energy, were presented in laymen´s terms with many simple illustrations.
Similarly, the Display campaign under the Intelligent Energy Europe Programme was partly supported by the ministry. In addition to printed material and workshops, free software was made available to local authorities that are responsible for public buildings in order to estimate energy consumption (see Figure 12).

In 2013, a manual for cost-optimal renovation was developed by the Ministry of Interior and the Budapest University of Technology and Economics. It was addressed to both residential and public building owners and managers. A longer electronic version is available on the www.e-epites.hu/3430 portal and a shorter printed version has been distributed at the public desks of the government (see Figure 13).

**III.v. Coverage of the national building stock**

There are 2,640,000 residential buildings and 38,000 non-residential buildings in Hungary. In 2014, the number of apartments is around 4,155,000 (data provided by the Central Statistics Office). The number of new apartments is approximately 10,000. The EPC registration system does not register whether the EPC belongs to a new or existing building. As a result, the number of buildings with EPCs is also unknown (only the number of EPCs is known).

Since the electronic registration of the EPCs started in January 2013, reliable statistics are available only after that date. By the end of 2014, a total of 201,134 EPCs were registered in the electronic system. The number of EPCs registered in the electronic system in the residential sector alone is 189,177. It represents mostly apartments or single-family houses and is approximately 4% of the total number of dwellings (individual flats plus single-family houses).

The total number of EPCs in the non-residential sector is 12,052.

The number of buildings with a certificate is unknown and, thus, the degree of coverage of the EPCs cannot be estimated.

**IV. INSPECTION REQUIREMENTS – HEATING AND AIR-CONDITIONING (AC) SYSTEMS**

Hungary has adopted alternative measures for inspection of heating systems and AC systems. This means that the inspection system will be replaced by other alternative actions, such as information campaigns on the exchange of obsolete or low-efficiency boilers, AC and heating systems. Such a campaign is already integrated in the NEEAP.

**IV.i. Report on equivalence of alternative measures**

Three percent (3%) of the 1.2 million boilers operating in Hungary have capacities below 20 kW, 80% have capacities between 20 and 30 kW, and 17% have capacities above 30 kW. Overall, 1,116 million boilers are affected by the EPBD requirement for onsite inspections. The share of household boilers is 90%, while the share of boilers in commercial and public institutions is 10%.

In 2013 the Ministry for National Development sent the report on equivalence of equivalent measures to the European Commission. The response of the Commission included a list of issues for clarification. The clarification process is still ongoing and no results are available yet.

**IV.ii. Progress and current status on heating systems**

The government has initiated several programmes to subsidise the installation of new condensing boilers to replace obsolete low-efficiency boilers and water heaters.

The Environmental and Energy Efficiency Operation Program supported heating system modernisation actions and the integration of RES for public buildings in the recent years. The applicants could select from several renovation packages, including complex renovation and different combinations of 2 or 3 retrofit measures.
In the autumn of 2014, a new programme for single-family houses and small apartment buildings was implemented. The programme provided non-refundable funds especially for retrofitting the heating system of residential buildings having less than 4 residential units. The budget of the subsidy programme was 100,000,000 HUF (330,000 €).

No further results are available yet.

**IV.i. Progress and current status on AC systems**

A total of 8,877 EPCs reported that the respective buildings or building units had an AC system, which represents only 4.4% of the total number of all EPCs that were issued. AC systems are rarely applied in Hungary, particularly not in the residential sector.

The support of AC systems is not a preferred element of the Hungarian energy policy actions. Instead of subsidising AC systems, the installation of shading devices is preferred. In the current ‘window exchange programme for single-family houses and small residential apartment buildings’ the installation of shading devices is a priority.

No further results are available yet.

### 3. A success story in EPBD implementation

The independent control system for EPCs was set up in the autumn of 2013 under the umbrella of the Budapest and Pest County Chamber of Engineers. The work is carried out on a 6 month basis where a package of 2.5% of the EPCs are randomly selected and submitted by the Lechner Non-Profit Organisation to the Hungarian Chamber of Engineers. The electronic EPC registration system provides the annex containing the calculation details of the EPC in pdf format (only the data of the first EPC page is registered in detail), which makes the work challenging. After the receipt of the EPCs, they are classified per location and are delegated to regional level with the involvement of circa 20 working groups, including about 70 independent controllers nominated by the County Chambers for further processing. The work is carried out on the basis of a common protocol.

A main element of the process is a pre-defined excel checklist that has to be filled in for all controlled EPCs. The checklist consists of nearly 100 fields that must be filled in. Sixty (60) of them refer to technical issues to be checked and the other forty (40) are administrative issues (identification number, address details, information about the expert, the controller, etc.). The QEs can select from dropdown menus, but there are also some fields for narrative descriptions. During the process, typical mistakes have to be checked together with the accuracy of the EPC calculation and results. As a first step, all EPCs (of the 2.5%) undergo an office check and the questionable EPCs are selected during this process for on-site visits. Twenty percent (20%) of the controlled EPCs are checked on-site by the same experts. A summary report is carried out afterwards. There are four possible evaluation results: ‘perfect’, ‘acceptable’, ‘EPC with a miscalculation of a difference by more than two energy classes’ and ‘probability of fraud’.

The reports are sent back to the Budapest and Pest County Chamber of Engineers for further processing where they are uploaded into an electronic database. Then, the controlled EPCs undergo a statistic analysis. A significant amount of useful information is obtained from this analysis about the experts, the controlled buildings, the typical mistakes and the general quality of the EPCs. The share of incorrect EPCs is below 10%.

It is also rather efficient to collect opinions of the controllers. All experts are asked to write a one page long expert opinion in each control period. Several recommendations have already been formulated and forwarded to the responsible Ministry of Interior including advice on improving the legislation. This is also a quality control check of the verification process. The system is regularly upgraded based upon the controllers’ opinion.

The experts are also evaluated, particularly those who were checked more than twice. Afterwards, an evaluation list is carried out about ‘good’ and ‘bad’ experts which is the basis for sanctions.

Sanctions will be applied for incorrect EPCs uploaded after January 2014. If an EPC fails with an error of more than two energy classes, the expert loses his licence for 3 years; this is currently the only possible sanction. Such sanctions will be issued only after the beginning of 2015. As the sanction is very strict, the suspicious EPCs have to be verified by at least two independent controllers. Hopefully in the medium term, these strict sanctions will have a positive impact on the quality of the EPCs, and thus on the general acceptance by the public.
4. Conclusions, future plans

The 2015 EPBD requirements for new buildings and major renovations will certainly bring important energy savings in the near future, although new and renovated buildings only represent a small share of the entire building stock in Hungary (around 4.3 million dwellings). Between 2008 and 2012 the number of new apartments has decreased from 35,000/year to around 10,000/year and the number of major renovations is still quite low. To mention a positive trend, a moderate increase has been experienced in the construction sector in the last two years, particularly for construction of public buildings. In addition, the annual GDP-growth of the country is better than the European average. However, the impact of applying energy performance requirements to new and renovated buildings is limited and will lead, within a short time-frame, to a moderate reduction in energy consumption in the building sector.

In spite of the difficulties, the introduction of energy performance requirements on partial renovations since 2013 and the introduction of cost-optimal requirements in 2015 for buildings that obtain public funding can have a remarkable effect. The National Building Energy Strategy envisages a significant reallocation of funds and support for the building sector for the coming period until 2020, but the strategy is still at the phase of open discussion by the end of 2014.

The introduction of the electronic registration of EPCs has brought around a very substantial increase in the number of certificates. As a result, most people know what an EPC means, although not all of them are convinced about its usefulness. However, the introduction of the independent control system in autumn 2013 and the strict sanctions from autumn 2014 onwards will probably have a positive effect on the quality of the EPCs, therefore improving the general opinion of the public. In the following years, the number of EPCs will stabilise to around 100,000 annual registrations. In the medium term, as the number of available EPCs increases, the mandatory advertising requirements will also have a significant impact on the market.

The recommendations made by experts in the certificate are important guidelines in the context of a renovation, or as an individual cost-effective measure and can be put to good use by the building owner. Financial concerns about the investment costs of using energy efficient technologies and the decreasing energy prices in Hungary are, however, a major obstacle in the present situation.

In the medium term (after 2018), the introduction of the cost-optimal requirements for all kinds of buildings and the NZEB concept after 2019 and 2021 will be determining factors in the construction market.