



András Zöld
Budapest University of
Technology and Economics
Hungary

More information can be
found at the ASIEPI
project website:
www.asiepi.eu

Similar Information Papers
on ASIEPI and/or other
European projects can be
found at the individual
project websites and in
the publications database
of the BUILD UP Portal:
www.buildup.eu

Hungary: Impact, Compliance and Control of legislation

The paper describes Impact, Compliance and Control related to implementation of EPBD in Hungary. Impact is analysed as a driving force towards application of new more demanding requirements, and their results. Compliance is referred to fulfilment of country's obligation, whereas control is discussed as a country's approach to quality of legal solutions.

1 > Hungary: Impact, compliance and control of legislation

As far as the professional problems are concerned Hungary has completed all preparatory actions by January 2006 facilitating the prompt implementation of the EPBD early 2006. At that time the text as well as the numeric values of the requirements, the algorithm of the calculation, a simple software, a printed and an electronic guide were available. Open conferences and a web-site facilitated the discussion. A few hundreds of interested professionals joined the first training courses.

Although the advancement seemed to be promising the Ministerial Decree TNM 7/2006, issued in May 2006 introduced a regulation covering only Articles 3, 4 5 and 6 of the EPBD. The regulation is in force since 01.09.2006. It is to be mentioned that the issue of the Decree would have been more delayed but the regular plenary meeting of the Concerted Action 1 and its satellite conferences in Budapest convinced the decision makers that we are on the right way.

The content of the regulation, covering Article 7 has been discussed and published in January 2006, too. Originally asset method has been chosen, based on the average climatic data and the "standardised" users' behaviour (the last deducted from statistics in case of residential, office and school buildings). The proposed asset method is simply the repeat-calculation of the design with the input data of the real building (existing or under commissioning). This method has been accepted in January 2006 by the professional society as well, as by the State Office of Housing and Building, being responsible for the implementation of the EPBD.

In summer 2006 the State Office has been dissolved, a few of its staff members continued their activity in the Ministry of Local Authorities and Regional Development. In the new administrative environment the ready to publish regulation became a subject of concerns because of the expected reaction of the general public, since a new service is spoken of, which is compulsory and should be paid, although it was not asked for. New ideas have been raised by the Ministry: the certification of existing buildings should be based on the energy bills, the cost of certification should not exceed the equivalent of about 50 € in the case of single family houses and individual flats, the advises, aiming at energy saving measures should be optional only. Finally late 2008 a Governmental Decree has been issued on

the implementation of the certification: according to this decree the certification of new buildings is compulsory from January 2009, that of the existing buildings will be started in 2011 only. The category of public buildings, obliged to display the certification has been restricted to the minimum.

There is no information who is developing or will develop the protocol of the energy bill based certification - at least the team, which developed the original proposal, is not involved. The method should be used only from 2011, however the experts would need some months before the start of the activity.

Regarding Article 10 the Chamber of Engineers and the Chamber of Architects agreed early 2006 that a common examination board will issue the licences for the experts. This agreement has been approved by the State Office of Housing and Building. The Chamber of Engineers was about to start the exams already in 2006, however, due to the lack of the regulation the exams were started only one and half year later.

2 > Impact of the EPBD on the national requirements

The new requirements are mandatory for building permits requested after September 1st 2006. Building permit must be asked for new buildings as well as for major renovation. In the last case the 1000 m² rule is recently applied. The main concept of the requirement system is the separation of the components of energy need into distinct categories: components, depending mainly on the building and those, depending mainly on the users.

Building element	U
Exposed wall	0,45
Flat roof	0,25
Attic floor slab	0,30
Heated attic	0,25
Floor slab over arcade	0,25
Floor slab over basement	0,50
Window, non metal frame	1,60
Window, metal frame	2,00
Non openable glazing	1,50
Toplit	2,50
Entrance gate	3,00
Door	1,80
Partition wall heated-unheated	0,50
Partition wall heated-heated	1,50

Although the distinction could not be "absolute" it is obvious that - at prescribed indoor temperature and climatic conditions - the net heating energy need to cover the transmission losses depends on the thermal envelope of the building whilst e.g. the net energy need to cover the domestic hot water consumption relates to the users. According to this concept the requirement system has three different levels: the building and its service systems must comply with all of them. The levels are the followings:

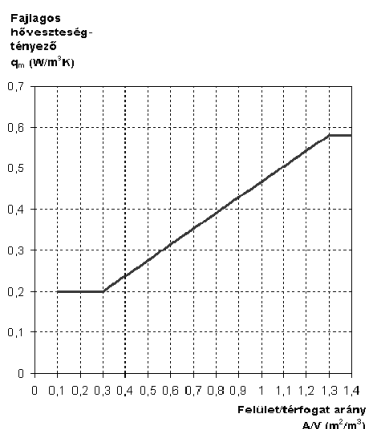
- > Building elements
- > Building
- > Building and service system together

The proof of compliance must be made at two steps: when requesting the building permit and after completion of the building.

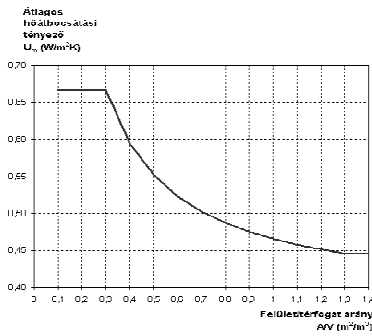
Regarding the building elements the U-values of wall, flat roof, attic floor slab, window, entrance gate, etc. are limited (see a sample in the table). The relative high U-value of wall is the consequence of a lobby actions - this value corresponds to the best masonry blocks without added insulation layer.

Whatever the case of the requirements on the level of the buildings the required U-values must not be exceeded. At the same time it is to be emphasised that the compliance with the requirements of building elements *does not guarantee* the compliance with the requirements of the building as a whole! Many times the requirements on the level of the building can be met only if the elements are better - it depends on the surface to volume ratio, on the glazed ratio, etc.

Regarding the building as a whole a specific heating load requirement and the risk of summer overheating must be checked.



Specific net heating energy demand W/m³K vs surface to volume ratio.



The overall average U value vs surface to volume ratio.

The specific heat load includes all building related components of the energy balance, namely:

- > transmission heat losses including thermal bridge losses,
- > utilised solar gains.

The unit of this specific value is W/m^3K , its range is 0,20 - 0,58 (see figure on the left). The requirement depends on the surface to volume ratio (in other terms on the form factor) of the building. This requirement must be met, whatever building use is. Regarding the utilised solar gains there are more options: they can be neglected (in this case better insulation should be applied), or the gains can be taken into account with a conservative value for shadowed facades or the gains can be taken into account with differentiated values for the different orientations if solar access is proven using shadow mask calculator. The more the utilised solar gains, the lower insulation level can be accepted, however no U-value of any building elements may exceed the limit, given in the table on the left.

The form of the requirement is the same as that of the national standard, being in force since 1993, however, the impulse of the EPBD resulted in more serious numeric values.

At the first sight the diagram may suggest that the requirement for larger and more compact buildings is very strict, however the reality is the opposite: the higher the surface to volume ratio, the more strict thermal insulation must be applied. Providing the solar gains are neglected, the overall average U-value (including windows, doors and thermal bridges) must not exceed the limit, shown in the diagram. The range is 0,44 - 0,67 W/m^2K . The above overall average U value is less by about 40% of the value, prescribed in the previous building regulation, issued in 1993.

With regard to the risk of summer overheating only a simple estimation is possible since the regulation relates to the building as a whole whilst the indoor temperature can be precisely calculated only room per room. The regulation aims at the limitation of the expected daily average indoor temperature. The input data includes the solar gain, the internal gains, correction factors, depending on the possibilities of natural and night ventilation and the thermal mass of the building.

It is important to mention that the fulfilment of the specific heat load requirement does not guarantee that the requirements regarding the building and the services systems together will be fulfilled.

The third level of the regulation includes the building and the service systems together. It is expressed in kWh/m^2a primary energy need. Gross energy need of heating, cooling, ventilation, domestic hot water and - except residential buildings - artificial lighting is taken into account. For residential, office and school buildings the limitation is prescribed as a function of the surface to volume ratio. Numerical values of the efficiency and the specific self-consumption of the service systems can be taken from the Tables of the Annex unless reliable and more precise figures can be given and proven by the designer. For other buildings and buildings of mixed use a reference value should be calculated, based on the assumption that the specific heat load complies with the requirement and the service systems correspond to reference systems, given in the regulation.

It is to be mentioned that the compliance with the specific heat load requirement does not guarantee that the annual primary energy requirement will be fulfilled: it depends on the service systems and on the energy carriers. Would be the last ones less favourable, the negative consequences must be compensated by better building.



The SOLANOVA building before refurbishment.



Close up of the SOLANOVA building after refurbishment. Inlets and outlets of heat recovery ventilation and collector array canopy can be seen.



Qualified Passivhaus in Isaszeg.



Passivhaus in Szada just before commissioning.

Impact of the EPBD on the building stock in terms of energy efficiency

The implementation of the new requirements together with the increasing energy cost has a definite impact on the new buildings. Pro forma all buildings with a building permit issued after September 2006 meet the new requirement, and the majority really does. Energy efficiency became a particular aspect in the PR activity of many designers and contractors. The demo project SOLANOVA proved that even an existing block of flats, build with prefabricated sandwich panels can be renovated according to the Passivhaus standard (85 % energy saving compared with the original state). The first single family houses which got the Passivhaus qualification from the Passivhaus Institute Darmstadt are the recurring topics in the media, proving that low energy building is not a mysterious dream but reality. Nevertheless the ratio of the new buildings is low - at the recent rate the change of the existing building stock would require more than a century.

This is why the refurbishment of existing buildings and HVAC systems is of great importance. Investment subsidies in the framework of the Governmental Programmes represent an important share. The part dealing with residential sector supports an implementation of measures for reduction of energy demand in apartment buildings which includes automatic control of heating systems, added thermal insulation, change of windows, in particular cases implementation of solar systems or heat pumps for space heating and DHW. Such programmes existed well before the issue of the EPBD and have been renewed and announced regularly.

It is to be emphasized that in the case of major renovation the same requirements are to be applied as for new buildings providing the floor area exceeds 1 000 m². The renovation is "major" if the cost of it exceeds 25% of the price of the building excluding that of the building site *and* the investment is spent for the building shell and/or the HVAC systems.

Regulations related to energy efficiency and indoor climate

Excepting the checking of the risk of the summer overheating which is a simple estimation for the building as a whole no special requirement is prescribed in the regulation since basic requirements (related to air change rate, Indoor Air Quality) are given in existing standards or may be (up to a limit) subject of agreement between the designer and builder.

A particular problem is the quality categorisation of office buildings. The expectations in the highest category (set indoor temperature in winter and summer, air change rate) seems to be exaggerated and not well established - at least making nearly impossible the fulfilment of the energy requirements.

Does EPBD affect the building prices, the building market and the building products?

No direct impact of the implementation of the EPBD can be proven. Price of the residential buildings or apartments depends on many factors such as the actual economic situation, the unstable exchange rate of the Hungarian currency, the inflation rate, the interest rate, the taxation and the subsidy system.

Regulations related to renewable energy

The Ministerial Decree 7/2006 includes the requirement that for buildings over 1 000 m². floor area the feasibility of use of renewable energy must be checked. The regulation includes the following steps:

Checking the technical possibilities (enough building area of appropriate orientation, slope and solar access for collector or PV array, existing

nearby district heating plant and network with free capacity, transportation distance and storage facility of biomass).

If one of the above possibilities exists, calculation of the primary energy is needed for that system, and calculation of the primary energy need for the same building with the reference heating system.

Preference is given to the system with lower primary energy need. Nevertheless the feasibility study in financial terms (discounted pay-back time, net present value) is not prescribed due to the unstable economic and financial situation.

Impact of the implementation of the EPBD on the qualification requirements and independence of energy experts for certification process.

The qualification requirements have been determined by the Chamber of Engineers. Certification may be issued by licensed experts. Licence can be obtained after having passed the exam. The examination boards consist of the representatives of the Chamber of Architects or Chamber of Engineers. The applicant must have a BSc or MSc degree in the relevant field (Mechanical Engineering with specialisation of HVAC systems or energy, Building Engineering, Architecture) and practical experience (the required length depends on the degree). In any case the applicant must be registered member of the relevant Chamber.

This license is valid exclusively for issuing certificate. The chambers provide other types of licenses authorizing other type of activities.

On the other hand the experts are not independent. It has already been mentioned that the Governmental Order limited the number of hours spent for a certification as well the hourly rate. The expert has no time allowance to check whether the building has been built according to the design. His/her possibility is restricted to review the calculation of the designer and to accept the statement of the contractor that the work has been carried out without any change comparing with the design.

The value of the certificate is further decreased by the fact, that according to the Governmental Decree the certification is to be issued within 60 days *after* the commissioning of the building. As a result the certificate is hardly more than a blank paper.

3 > Compliance and control¹

Compliance of the EP requirements for buildings

The fulfilment of EP requirements in respect of the design is acceptable. Requirements exist on three levels and are to be applied in case of major renovation. Design guides and unified software are available. Technical feasibility of the use of renewable energies must be checked. The fulfilment of the regulation on all three levels of the requirements is the precondition of the building permit. Pro forma the local authorities have to check the calculation and the design however many times they settle for the declaration of the designer that the requirements are met.

Compliance of the EP certification process

No compliance can be spoken of since the certification of existing buildings will be started only in 2011. As far as new buildings are concerned the restricted time allowance and hourly rate mean hardly more than a signature on a form.

¹ Compliance means the fulfilment of EP requirements and EP certification process while control is the mechanism for checking the compliance.

Qualified Experts

Certification may be issued by licensed experts. Licence can be obtained after having passed the exam. The examination boards consist of the representatives of the Chamber of Architects or Chamber of Engineers. The applicant must have a BSc or MSc degree in the relevant field (Mechanical Engineering with specialisation of HVAC systems or energy, Building Engineering, Architecture) and practical experience (the required length depends on the degree). In any case the applicant must be registered member of the relevant Chamber.

Although participation at training course is not a precondition of the examination (since printed guide and interactive electronic guide are available) about 1500 practicing engineers and architects joined the training courses, run by universities and other bodies. The Chamber of Engineers together with the Chamber of Architects started the examinations in 2008. The subject area of the examination is the asset method of certification since disregarding the before mentioned ominous sentence no rules, protocols of certification based on energy bills have been published. At this moment (end of 2009 it does not represent a problem (!), since the certification of existing buildings will be launched only in 2011. Providing the certification method will really be changed for existing buildings, the training courses as well as the examinations should be restarted or it will be supposed that those having already the licence will learn the new regulation on their own.

The intention that certification may be issued by energy suppliers makes disputable the independence of experts.

Quality control

When the question of the Quality Assurance has been raised the responsible ministry has had different offers. One of its background institutes as well as both of the Chambers shown interest, all of them have had neither experience nor infrastructure for data collection and elaboration. The necessary development would have cost of 80-90 Million HUF. There was a commercial initiative (from RAMSYS), which has a long term experience in the field of data collection and elaboration. It means that the data of the certification can be uploaded on-line to a central server. During the process the consistence of the data and the accuracy of the calculations are checked: in case of any problem the user will receive an alert. Data are saved safely, can be downloaded by those who have access, data can be filtered and selected for statistical purposes, etc. The infrastructure was and is ready to use, the EPB software was added special modul for the communication of the server, a few hundreds tests have been carried out successfully. No financial support has been requested. This offer has not been accepted. Actually the certificates (together with many other documents) are collected in a background institution of the ministry as a loose pile without checking - the procedure (due to the collection of designs) is on the desk of the ombudsman.

4 > Additional incentive policies related to the EPBD

Investment subsidies in the framework of the Governmental Programmes represent an important share. The part dealing with residential sector supports an implementation of measures for reduction of energy demand in apartment buildings which includes automatic control of heating systems, added thermal insulation, change of windows, implementation of solar systems or heat pumps for space heating and DHW. Such programmes existed well before the issue of the EPBD and have been renewed and announced regularly.

ASIEPI partners:

BBRI (BE; technical co-ordinator), NKUA (GR; financial & administrative co-ordinator), TNO (NL), IBP (DE), SINTEF (NO), CSTB (FR), Cete de Lyon (FR), REHVA (BE), ENEA (IT), AICIA (ES), NAPE (PL), VTT (FI), E-U-Z (DE), Enviros (CZ), SBi (DK)

Associated partners:

Eurima (BE), PCE (BE), ES-SO (BE), EuroAce (BE), FIEC (BE), Acciona I (ES)

Subcontractors:

Kaunas University (LT), University of Budapest (HU), University of Bucharest (RO), BRE (UK), UCD (IE)

Link: www.asiepi.eu

Original text language: English

As the subsidy budget for each Programme is limited only part of the applications are granted. Selection is usually based on the time of application (the earlier submission means bigger chance for grant).

Exigency rather than energy consciousness resulted in the wide spreading or return of the use of biomass in villages where the boiler and the fuel of existing central heating systems have been changed.

A new incentive programme has been prepared. It is based on the Green Investment Scheme, paid out of revenues from emission trading. A further version called Blue Investment Scheme is under development. In these schemes the subsidy depends on the energy efficiency of the renovated building: the higher category will be achieved the higher will be the financial support. Rules of calculation and monitoring have been developed, however due to the unstable economic situation they are not implemented yet. This programme will not be restricted to prefabricated blocks of flats. Eligible applicant for the subsidy will be private owner, housing associations, association of owners and municipalities.

5 > References

1. Dr Csoknyai Tamás: Solanova projekt, a jövő panelháza, part 1 and 2. MAGYAR INSTALLATEUR (ISSN: 0866-6024) 18:(8) pp. 48-49. (2008).
2. Dr. Csoknyai Tamás - Talamon Attila: Passive houses in Hungarian environment. 15th "Building Services, Mechanical and Building Industry Days". International Conference, Debrecen, 15-16 October 2009, ISBN 978-963-473-314-0, pp. 94-106.

Disclaimer: ASIEPI has received funding from the Community's Intelligent Energy Europe programme under the contract EIE/07/169/SI2.466278.

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Communities. Neither the European Commission nor the authors are responsible for any use that may be made of the information contained therein.

© European Communities, 2009
Reproduction is authorised provided the source is acknowledged