POLISH SITUATION ON IMPLEMENTATION OF EPBD 91/2002/EU

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TIMETABLE

2005
2006
2007
Construction Act 17th September
Ordinance about training January 2008

22 April 2008 end of public consultations of

• Project of Methodology of Calculation Ordinance

• Project of amendment of Technical Condition Ordinance

• Project of amendment Building Design Ordinance
CONSTRUCTION ACT

The legal framework of implementation is based on the national act and accompanying ordinances. On 19th September 2007, the Polish Parliament accepted the changes to the Construction Act. The changes define rules for creating buildings’ energy assessment and certification system together with inspection of energy efficiency of building systems, by regulating:

- legal situations where the obligation for possessing certification of energy characteristic for buildings and apartments, by introducing new duties for investors, building managers and owners,
- creation of conditions for groups of experts mandated to prepare certificates of energy characteristics,
- creation of conditions for inspection of boilers and air-conditioning systems, and one off inspection of heating installations with boilers older than 15 years.
Beginning from 1st of January 2009, according to regulation of Construction Act, the certificate of energy characteristic will be required, for building:

- designed to operation,
- modernised or renovated, if as a result of investment, the change of energy characteristic took place,
- on sale or when rented.

Adequately, also from 1st of January 2009 the obligation of possessing certificate of energy characteristic for apartments on sale is required.
1. Ordinance on training and examination of experts pretending for rights to elaborate energy characteristic certificates for buildings, apartments and building parts constituting separate technical – functional area signed 21st of January by Ministry of Infrastructure published in Official Journal nr. 17 position 104,

2. Project of amendment of Ordinance of Ministry of Infrastructure from 3 July 2003 about detailed scope and form of building design
SECONDARY LEGISLATION

3. Project of amendment of Ordinance of Ministry of Infrastructure from 12 April 2002 about technical criteria to be met by buildings and their localisation is: assuring realisation of more stringent energy policy for buildings stock with the provision of adequate indoor environment quality, creating the framework for energy assessment through the definition of reference building fulfilling permissible requirements and giving opportunity of preparation of adequate quality of certificate for buildings, theirs separate parts or apartments, along with possibility of proper certificate verification. Data included in the Annex Insulation requirements and other requirements related to energy savings are covering:
SECONDARY LEGISLATION

- more stringent insulation requirements for walls and windows,
- limiting vapour condensation due to the introduction of requirement about critical temperature coefficient in heated volumes,
- more precise requirements about proper insulation of floors on ground in heated compartments,
- requirements limiting the overheating risk by protection of the solar radiation transmission through the windows, glass and transparent facades, limiting infiltration through windows and doors, and favouring the air inlets installation,
- enabling assessment of energy performance according to the mandate of Construction Act.
SECONDARY LEGISLATION

- New values of heat loss coefficient for walls, roofs and roof ceilings, calculated according to Polish Standards PN EN ISO 6946, PN-EN ISO 10077-1 related to calculation of heat resistance and heat transmission coefficients taking into account thermal bridges cannot be bigger than $U_{k(\text{max})} = 0.3 \text{ W/m}^2\text{K}$ (walls), $0.25 \text{ W/m}^2\text{K}$ (ceiling roofs), $U_{k(\text{max})}$ windows (in walls) I, II, III climate zones - $1.9 \text{ W/m}^2\text{K}$, IV i V climate zones $1.7 \text{ W/m}^2\text{K}$, roof windows $1.8 \text{ W/m}^2\text{K}$.
SECONDARY LEGISLATION

4) Ordinance about methodology of calculation of energy characteristic for the whole building, separate apartment or building part constituting separate technical – functional area along with the scope and template for energy characteristic certificate. The template has 4 pages and contains the information that can be used by building users, and for the (planned) central register and quality control purposes. Certificate contains:
SECONDARY LEGISLATION

- title page with basic data about building and its energy class,
- technical - operational characteristic of building, page 2,
- detailed energy characteristics of all types of energy use that are determinate integrated characteristic $R$ for the purpose of energy class assignment. Data provided on this page (3) is giving the additional information:
  - for certificate user, about the building energy performance for heating, cooling, hot water and lighting,
  - for supervisory bodies about quality of the class determination,
- recommendations, for owner, about possibilities of decrease of energy use by improvement of building operation and by its thermo modernisation. Finally, the references to legal mandates are presented (page...
ŚWIADECTWO ENERGETYCZNE BUDYNKU

Nr ................

Adres budynku: .................................................. Kod pocztowy: .........................

Nazwisko i nazwa właściciela budynku: ........................................................

Wartość charakterystyki energetycznej wyznaczająca wielkość energii niezbędnej do zapobiegania potrzeb energii budynku:

\[ EP = \text{kWh/m}^2 \]

Wartość niewagową oceny zapotrzebowania na energię dostarczaną. R. klasa budynku

<table>
<thead>
<tr>
<th>Wartość istniejącym do osiągnięcia</th>
<th>Wskaźnik</th>
<th>Możliwość</th>
</tr>
</thead>
<tbody>
<tr>
<td>R \leq 0.3</td>
<td>A1</td>
<td>A2</td>
</tr>
<tr>
<td>0.3 &lt; R \leq 0.5</td>
<td>A2</td>
<td>B1</td>
</tr>
<tr>
<td>0.6 &lt; R \leq 0.7</td>
<td>A2</td>
<td>B2</td>
</tr>
<tr>
<td>0.7 &lt; R \leq 0.8</td>
<td>A2</td>
<td>C1</td>
</tr>
<tr>
<td>0.9 &lt; R \leq 1.1</td>
<td>A2</td>
<td>C2</td>
</tr>
<tr>
<td>1.1 &lt; R \leq 2.0</td>
<td>A2</td>
<td>D1</td>
</tr>
<tr>
<td>2.0 &lt; R \leq 2.5</td>
<td>A2</td>
<td>D2</td>
</tr>
<tr>
<td>2.5 &lt; R \leq 3.0</td>
<td>A2</td>
<td>E1</td>
</tr>
<tr>
<td>R &gt; 3.0</td>
<td>A2</td>
<td>E2</td>
</tr>
</tbody>
</table>


Łącznie z Biurą UF1002 R/BC

Imię i nazwisko sporządzającego świadectwo.................................................................
Adres i telefon: ................................................................. Podp.: ....................................

Data wystawienia .......................... Data ważności świadectwa: ..........................
### CHARAKTERYSTYKA ENERGETYCZNA BUDYNku

<table>
<thead>
<tr>
<th>Omówienie danych charakterystyki energetycznej</th>
<th>Ogrzewanie i chłodzenie</th>
<th>Przyciśkowanie ciepłej wody</th>
<th>Oświetlenie</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Wskazniki charakterystyki energetycznej</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nazwa i jednostka</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Wartość energetyczna</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Wartość energetyczna</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>R i</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Całkowite ilość energii (kWh/m²) osiągane dla danego budynku</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Osiągniętość energii (100%)</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Osiągniętość energii (100%)</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Koduje rozkład energii i ilość przekraczająca wizaż energii w danej jednostce</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
</tbody>
</table>

Uwaga: Kolumna "Oświetlenie" dotyczy tylko budynków o średnicy publicznej.

### WSKAŹNIK DO INTEGROWANEJ OCENY ZAPOTrzebowania NA ENERGIĘ DOSTARCZANĄ DO BUDYNku

**R** = \[ R_{W} \times f_{H} + R_{W} \times f_{W} + R_{R} \times f_{S} \]


### UWAGI

w sprawie możliwości zmniejszenia zużycia energii

1) Uwagi dotyczące możliwych zmian ograniczających zużycie energii w trakcie eksploatacji budynku/mieszkania:

2) Uwagi dotyczące możliwych zmian ograniczających zużycie energii związane z korzystaniem z ciepłej wody użytkowej:

3) Inne uwagi osoby sporządzającej świadectwo energetyczne

### INFORMACJE DODATKOWE

1) Niniejsze świadectwo energetyczne budynku zostało wydane na podstawie danego oświaty energetycznej budynku zgodnie z przepisami Ustawy z dnia 19.09.2007 o zmianie ustawy – Przepisy Budowlane (Dz.U. z 191, poz. 1773) oraz Rozporządzenia Ministra Infrastruktury z dnia ... w sprawie metodologii obliczania charakterystyki energetycznej budynku i lożka mieszkalnego lub części budynku stanowiącej samodzielny całość techniczno-syntetycznej oraz sposobu sporządzania i ważności świadectw na charakterystyki energetycznej (Dz.U. z ...)

2) Świadectwo traci ważność po wydzieleniu podanego na str. 1 oraz w przypadku zmiany przestrzeni budynku lub wykonania modernizacji w danym budynku.

3) Obliczona w sumieniu charakterystyka energetyczna „EF” wyznaczona w PE/m²/sec jest wartością oficjalną przedstawiającą zasobną wynagrodźcze znaczenie energii dla przyjętego sposobu użytkowania i standardowych warunków stosujących i jako taka nie może być pozwolona do obliczenia opłat za zasobną zasobności energii w budynku.

4) Dalsze w modernizacji budynku wykonywane przez pracownika jego zasobno energetycznej z osa energetycznej budynku referencyjnego

5) Wszystkie dane energetyczne budynku można uzyskać przez poprawianie jego cech technicznych wykonując modernizacje.
Methodology - Polish approach - assumptions and context

• No database of energy consumption in buildings (of course all building are metered, but the data about building itself is not collected at the same time)

• It should be one method for all types of buildings (as on a design stage they are a subject of same regulation with different permissible values or specific requirements)

• Experience with countrywide auditing system where the calculations have to be performed in order to get the state bonus for the investment – group of experts with knowledge about calculation.

• Methodology should prefer calculation approach not measurements

• Difficulty of monitoring regulation related to energy performance requirements even only for apartment buildings
Concept of reference building

Assignment of energy class for particular building is proposed in relation to so called reference building and expressed by dimensionless indicator called integrated energy performance indicator $R$

The reference building is the virtual building similar to assessed one in terms of shape, operational areas and profiles of use but with components fulfilling minimum requirements for newly constructed building (e.g. $U$ values), referenced system efficiencies, and energy weights equal to 1, except those used for media transport (e.g. energy used for circulation pumps in heating system).

The $R$ is not a subject of regulation.
Integrated energy performance indicator R

Energy performance indicator R is not sensitive to climatic conditions

Energy performance indicator R is not sensitive to building shape

Low values of R (< 1) indicates that:

• buildings components have better parameters than reference
  or/and

• efficiencies of the systems are better than reference
  or/and

• energy source is more ecological than reference
Scales of energy performance vs. reference building

- Database on energy consumption in non residential buildings is usually incomplete (only part of the sector is covered and energy use for certain purposed (e.g. lighting or cooling) is not reported)
- Data has to be adjusted according to climactic conditions
- Significant differentiation of buildings leads to big number of scales
- Big differences between buildings belonging to the same category (architecture, use profiles etc.)
- In case of very specific buildings category may cover just few buildings
- Many buildings are multi purpose buildings

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Do we know the energy performance scales for these buildings?
**Methodology of integrated energy performance indicator R calculation**

Components describing level of fulfilment of direct requirements employed in assessing to reference building

\[ R = R_H f_H + R_W f_W + R_C f_C + R_L f_L \]

- **Heating & ventilation**
- **Hot water**
- **Space cooling**
- **Artificial lighting**

Share of energy use for specific purposes within the total energy used \( E \), all in the assessing building

\[ E = \sum_i \left( w_i \cdot \sum_j Q_{Hi,j} \right) + \sum_i \left( w_i \cdot \sum_j Q_{wi,j} \right) + \sum_i \left( w_i \cdot \sum_j Q_{Li,j} \right) + \sum_i \left( w_i \cdot \sum_j Q_{Ci,j} \right) \]

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Integrated energy performance indicator and energy class of building

<table>
<thead>
<tr>
<th>lp</th>
<th>Energy ware</th>
<th>Correction coefficient – $w_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuels oil</td>
<td>1,1</td>
</tr>
<tr>
<td>2</td>
<td>natural gas</td>
<td>1,1</td>
</tr>
<tr>
<td>3</td>
<td>propane</td>
<td>1,1</td>
</tr>
<tr>
<td>4</td>
<td>coal</td>
<td>1,1</td>
</tr>
<tr>
<td>5</td>
<td>brown coal</td>
<td>1,2</td>
</tr>
<tr>
<td>6</td>
<td>wood</td>
<td>0,2</td>
</tr>
<tr>
<td>7</td>
<td>Heat - cogeneration</td>
<td>non renewable energy</td>
</tr>
<tr>
<td>8</td>
<td>renewable</td>
<td>0,0</td>
</tr>
<tr>
<td>9</td>
<td>District heating</td>
<td>non renewable energy</td>
</tr>
<tr>
<td>10</td>
<td>Electricity</td>
<td>non renewable energy</td>
</tr>
</tbody>
</table>
METHODOLOGY OF CALCULATION

Basis for the calculation procedure for heating and cooling energy demand is standard:

FDIS (PN)-EN ISO 13790

“Calculation of energy demand for heating and cooling” and data base of climate data monthly and hourly – reference year acc. ISO EN 15927 (1-6)
CALCULATION METHOD FOR ENERGY CERTIFICATE

Simplification of calculation method for residential buildings and apartments are planned (monthly balance method from EN ISO13790)

These certificate should be relatively easy to prepare and be of low cost.

The volume of flow of certificate is estimated for 500 000 yearly (new, sold or when rented) with approx. 5-10% will require more detailed calculation (e.g. buildings equipped with cooling installation).
ENERGY CERTIFICATES

Serious problem:
Preparation of experts able to undertake from 1.01.2009 certification duties for all the qualified buildings and apartments.

It is a need for preparation of training materials and there is no time!!!

However it can officially be solved by giving chartered engineers and architects rights to prepare certificate on a basis of existing authorisation without examination requirements.
Thank you for your attention and I would like to invite you to visit a site of www.energiaibudynek.pl a Journal of Association of Energy Auditors (non-governmental entity) where additional information about

• Certification
• Auditing
• Thermomodernisation and
• Energy

can be found (unfortunately in Polish only)
Thank you !!!!!

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