HOW POLISH GOVERNMENT IMPLEMENTS DIRECTIVE 2010/32/EC

DR LUDOMIR DUDA

The preparation of the study was supported from the Visegrad Fund

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CURRENT EPBD I (2002/91/EC) REQUIREMENTS

SUMMARY OF REQUIREMENTS

Describe which of the following main energy systems are included in the energy certificate in your country, and how.

Heating

Heat demand for heating is calculated on the basis of a procedure prepared on the basis of the c standard. In comparison with the standard, certain modifications were introduced, consisting in including twice the temperature difference between the ground temperature and outside temperature. For the first time as Ugr = U equiv,bf, in accordance with PN-EN 12831:2006, and for the second – as btr,i=0,6. One btr,i value is accepted for the whole heating season, not in accordance with EN ISO 13790, where monthly btr,i values are accepted.
This causes about 35% underestimation of ground heat losses. Moreover, modifications were introduced to the formula for Vx infiltrating air in mechanical ventilation systems, which makes it impossible to calculate it.

Hot water

Heat demand for hot tap water was adopted on the basis of design documentation, consumption measurements or values from Table 15 of the *Decree of the Minister of Infrastructure of 6 November 2008 on methodology for calculating the energy performance of residential buildings and premises or a part of a building constituting an independent technical usable entirety, and the method for preparation of certificate templates of their energy performance (ROC)* - 35 [dcm3/per 24 hours] of water at 55 °C for sin gle-family houses. This leads to a huge diversity of demand for heat depending on the method accepted. Design standards assume a three times higher consumption of hot water (110 [dcm^3/24 hours]) than the actual use and value from Table 15 of ROC.

Cooling

It is assumed that the building has cooling installations if two of its rooms are cooled. There is no template of an energy performance certificate for residential buildings with a cooling installation. The methodology for calculating heat demand was developed based on the monthly method, the EU ISO 13790 Standard. The methodology contains many factual errors, including the change of the power in the Stefan Boltzmann Law $h_r = 4$□□ (□ $_{ss}$ +273)^4, ROC formula No. (2.28.4)). These errors usually lead to the understated heat demand for cooling in the certificates.

Ventilation

Heat demand for heating the ventilation air is calculated in accordance with EN ISO 13790, together with the demand for heat to cover losses by infiltration as heat for heating the building. Ventilation air stream is assumed to be consistent with the Polish Standard No. PN-83 B-03 430 See - Heating

Artificial lighting (different for building users, what kind of lighting)

The energy used for lighting is included only for built-in lighting in buildings other than residential buildings (office, commercial buildings), etc.

Describe the main criteria used for energy certificates.

Total primary energy consumption

In accordance with ROC, primary energy demand equals $Q_P=w_j*Q_K$
where:

w_j – coefficient of primary unrenewable energy consumption for production and delivery of final energy carrier (or of energy) to the assessed building.
Q_K- demand for final energy

Table 1 Coefficient of the wi - primary unrenewable energy consumption for production and delivery of energy carrier or energy to the building

No.	Final energy carrier		*wi consumption coefficient*
1	2		3
1	Fuel/source of energy	Fuel oil	1.1
2		Natural gas	1.1
3		Liquid gas	1.1
4		Hard coal	1.1
5		Brown coal	1.1
6		Biomass	0.2
7		Solar collector	0.0
8	Heat from cogeneration[1)]	Hard coal, natural gas[3)]	0.8
9		Renewable energy (biogas, biomass)	0.15
10	Local heating systems	Heat from a coal heating plant	1.3
11		Heat from a gas/oil heating plant	1.2
12		Heat from a biomass heating plant	0.2
13	Electrical energy	Mixed production[2)]	3.0
14		Systems [PV4)]	0.70

1) combined production of electrical energy and heat,
2) refers to power supply from an electrical energy network in the system,
3) in the case of lack of information about energy performance parameters of network heat from the heating plant (cogeneration), the value of H = 1.2 is accepted,
4) photovoltaic cells (production of electrical energy from solar energy)
Note: thermal solar collector - wH = 0.0

Consumption of unrenewable primary energy sources

As presented in Table 1, the accepted value of " w_j " is largely misleading as regards the environmental consequences of the use of various types of fossil fuels, particularly in terms of the volume of CO_2 emissions. Probably, this is aimed at promoting coal fuels in Poland. This method of promotion is effective, and more and more newly-built buildings are powered with a hard coal with a misleading name – Ekogroszek (Eco-pea), thus contributing to the devastation of the natural environment. However, no "w_j" values for micro wind turbines were specified.

End-use energy consumption

In accordance with ROC, final energy demand Q_K, = Q_{nd} /η_{tot}
Where:
Q_{nd} - demand for energy for heating, cooling, in accordance with EN ISO 13790 and for hot water
η_{tot} – total efficiency of the following systems: heating, cooling, ventilation, and hot water preparation systems. The manner of defining partial efficiencies in ROC makes it difficult, in the case of heating, to plan the investments that increase the efficiency of installation by integrating the efficiency of regulations with the energy use efficiency. In the case of defining hot water preparation efficiency, an improvement of use efficiency was excluded, and its value was imposed at the arbitrary level of $\eta_{W,e}$ =1. This effectively eliminates the use of water-saving fittings.

Heating energy demand

It is calculated in accordance with the EN ISO 13790 standard, by means of the $Q_{H,nd,n} = Q_{H,ht} – \eta_{H,gn} Q_{H,gn}$ formula
Where:
$Q_{H,ht}$ – monthly heat losses by infiltration and ventilation
$\eta_{H,gn-}$ coefficient of using the gains
$Q_{H,gn-}$ sum of living and solar gains

Cooling energy demand
Cooling energy demand is calculated in accordance with the EN ISO 13790 standard, similarly to the heating energy

Mean U-value

A Decree of the Minister of Infrastructure of 6 November 2008 amending the decree on technical conditions for buildings and their location (later referred to as TC) introducing the EPBD I directive (2002/91/EC) changed the border values of U-value indicators.
TABLE 1

No.	Partition	U_{kmax}[W/m^{2}K] 1996	U_{max}[W/m^{2}K] 2008
1	External wall	0.5*/0.3	0.3**
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	Floor on ground	0.6	0.45**
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- *for one-layer walls
- **for renovated buildings, without defining the scope of renovations, these values may be higher by 15%.
  As seen in Table 1, the change from U_{kmax} to U_{max} means a decrease in the heating insulation power requirements for new and renovated buildings, by as much as several orders of magnitude.
  Others

OTHER INFORMATIVE INDICATORS

(Describe if there are any other informative indicators used in your country in order to provide further information for customers, especially about costs associated with it.)

There are no other indicators in Poland, and, truth be told, there are no indicators to inform consumers, especially about costs associated with it. On the contrary, there exists a system of misinformation which misleads consumers. Starting with the certification system which, prepared in accordance with the ROC, provides false information about energy consumption, to fundamental misinformation in the form of TC. They have been changed, so that it's possible to largely decrease the construction costs at the cost of energy standard. These changes are, above all, elimination of the "collective residence buildings" and replacing it with the general category of residential buildings. As a result, legal restrictions on energy consumption by these buildings were eliminated. Until now, obtaining satisfactory profits in the multi-family housing market required forging the design documentation and stating false values of the index of seasonal energy demand for heating, "E". According to the research of the Polish Building Research Institute, it was common practice. Currently, there are no restrictions on heat demand for heating multifamily buildings. It suffices if the „U" heat conductivity coefficients satisfy the requirements of the Annex to the "Regulation on technical conditions to be met by buildings and their location" (hereinafter referred to as TC).

In the TC of 2002, this situation only referred to single-family housing for which the "E [kWh/m^{3}year]" index did not need to be calculated if the building partitions corresponded to the "U_k" values from the table that was the annex to the TC. Numerous simulations were performed then, which indicated that in single-family houses built with partitions in accordance with the TC, the E indicator was over 50% greater than the border value of E_0. The amendment to the TC included some cosmetic changes of the values of the "U" coefficient, and one revolutionary change in its definition. This revolution was the replacement of the thermal conductivity "U_k" coefficient, which took into account partition thermal bridges, with the "U" coefficient, i.e. without taking them into account. This is of vital importance for construction costs and heat demand. Elimination of thermal bridges both increases the construction costs and reduces the demand for energy. Accepting the border value of coefficient U = 0.3 [W/m2K] in the amended version of the TC, may mean that the coefficient value U_k= 1.16 [W/m^{2}K] in the previous TC version, which indicator was in effect since 1966. Another advantage of the new TC for the heating sector, is making the limit on window area contingent upon the heat transfer coefficient higher than U=1.5[W/m^{2}K], with

the lowest energy standard for windows in the market amounting to U_w=1.4[W/m^{2}K]. The elimination of the limit on the heat demand for heating multifamily buildings means the elimination of restrictions on the surface of glass windows in the fashionable “glass” apartment buildings.

At the same time, it decreased the costs of building such houses, because the absolute restrictions, effective until 2008, on the value of the indicator of heat demand for heating - “E[kWh/(m^{3}year)]” forced the use of energy-saving windows, which are much more expensive. At the same time, such buildings require much more energy for heating and cooling. In order to complete the list of all advantages for the energy sector and developers brought by the introduction of the 2002/91/EC directive in Poland, the normative coefficient of heat transfer through ground floor should be noted. As long ago as in 2002 in the TC, its value amounted to U_k=0.6[W/m^{2}K], i.e. higher by 50% from the heat transfer coefficient for external wall, although the difference between the internal temperature and the mean heating season temperature, amounts to about 0.6 of such difference for ground temperature. Thus, in order to maintain the proportional share of losses through the floor, this coefficient should amount to U=0.5[W/m^{2}K]. The significance of this difference may be understood if we take into consideration the fact that floor on the ground is the only construction partition which may not be subjected to thermal efficiency improvement. A high share of floor on the ground in the energy balance of a building means a decent minimum of demand for energy for a building undergoing thermal efficiency improvement. In the CT from November 2008, the value of heat demand indicator was changed from U=0.6[W/m^{2}K] to U=0.45[W/m^{2}K]. In order to weaken the effects of this change, the share of energy transfer through ground floor (~36%) was radically decreased in the “Certification Regulation”, by taking twice into account the temperature difference between the mean heating season temperature and the mean ground temperature,. Once as the equivalent coefficient of heat transfer U equiv,bf, in accordance with the PN-EN 12831:2006 standard, and the second time – as the temperature difference reduction coefficient btr,i=0.6.
Also, it should be appreciated that the Government made the effort to reduce the negative for the turnover of the energy production sector of the “2006/32/EC Directive” mentioned in the introduction. After twenty drafts of the act, it was finally adopted in the version which, through degree of complication and end-user, should limit, to the minimum level, the drop in demand for energy. At the end of this discussion of the results and achievements of the Government in securing, in terms of legislation, the demand for energy, I will present the most important provisions here, i.e. §328 and 329 of the TC.

Paragraph 328.1. of the TC reads as follows: “The building and its heating, ventilation, cooling and hot tap water installations, and in the case of a public building – also built-in lighting installation, should be designed and constructed in such a way that the amount of heat, coolness and electrical energy required to utilize the building in accordance with its dedication, may be kept at a rationally low level.” The term “rationally low level” in everyday understanding must mean the optimum level in terms of costs, defined in art. 2 point 14 of the “2010/31/EC Directive” – “it means the level of energy performance resulting in the lowest cost, during the estimated economic lifecycle, where:

a) the lowest cost is determined taking into account the investment costs, maintenance costs and operating costs associated with energy [...]”.

In turn, §329.1. of the TC states that “Requirements determined in § 328 item 1 are deemed satisfied for a residential building if:

1) the external partitions of a building and the installation technology meet the requirements of thermal insulating power, and the area of windows meets the requirements specified in point 2.1 of Appendix No. 2 to the regulation [...]". In the table in the appendix, the maximum heat transfer coefficient values were specified for: external walls U=0.3[W/m^{2}K], roofs U=0.25 [W/m^{2}K] and floors on the ground U=0.45[W/m^{2}K]. As follows from the contents of §329 of the TC, these values meet the requirement of "rationally low level" of demand for energy for heating residential buildings. The significance of this provision should not be underrated for the increase of demand for heat, because the values of these coefficients, at current costs of energy and insulation materials, are over three times higher than the "optimum level in terms of costs" in accordance with the TC. The decision of the Minister of Infrastructure on stating untrue information in the regulation, mainly about the rationality of heat transfer coefficients of construction partitions, was doubtlessly aimed at ensuring a high level of profits at developers' market and at guaranteeing a high level of demand for energy. Its consequence is the construction of a dozen or so million of square meters of buildings per year, with impressive, for our times, demand for heat (about 100kWh/(m^2*year) on average). If the Minister of Infrastructure had complied with the EU Directives provisions, the demand for energy in new buildings could have been even five times lower. What is also important is that even though constructing low-energy buildings is very profitable for the buyer, thermal efficiency improvement of buildings constructed in accordance with the TC energy standard is completely unprofitable. This guarantees maintaining a demand for energy in these buildings, at this very high level, for the next decades.

Decreasing the admissible energy standard for buildings by amending the TC of 06 November 2008 had to cause higher demand for energy used in developers' apartments. This results from the "imperfection of the market, which makes it difficult to effectively use the final energy" – described in art. 1 of the "2010/31/EC Directive". This imperfection is the gap between expenditure and profits at the market of constructing apartments for sale. In the conditions where the value of a real property depends most of all on its location, the expenditure on increasing its energy standard is borne by the investor, while the profits on account of low maintenance costs – are enjoyed by the buyer. This "imperfection of the market" results in a situation where investors construct in accordance with the standards below them worse, hoping for the "leniency" of building inspectors.

In theory, people who build for themselves are not limited by these relationships, and so they should build according to the "optimum in terms of costs" standard. It is not so, however, and the reason for that may be found in the state authority, which declares that the heat transfer coefficient values stated in the TC are rational, and thus indicate that decreasing them is permissible but irrational. It is hard to question this authority, supported by competent scientific institutes, such as Polish Academy of Sciences and higher education institutions. Thus, practically 100% of constructed buildings have the energy standard much worse than the "optimum level in terms of costs".

The contents of paragraph 329 of TC is evidence of the determination of the Minister of Infrastructure. This is because this paragraph is inconsistent with:

§328 of the same TC; Art. 5 of Construction Law, and with Art. 5 of the Constitution of the Republic of Poland. It not only breaches the obligations made in the Treaty of Accession, but also introduces Directives in a different manner.

Economic analysis of renewable energy sources, cogeneration, central heating plant

There are no undergoing analyses of alternative energy sources, and the formal requirement of Construction Law in this scope is satisfied in the form of designer's declaration about economic unprofitability of such alternatives, not backed by any analysis.

METHODS

Describe briefly the methods used for energy performance certificates, with the use of at least the following points:

Data (only data from calculations based on drawings) vs. operation only measurement data)

The only data is design data and as-built documentation. For utilized buildings, there is even no obligation to provide information about energy consumption based on its meters.

ENERGY PERFORMANCE / EFFICIENCY REQUIREMENTS

There are no border requirements related to energy consumption in buildings. However, there exist reference values specified at a shockingly high level. In accordance with §329 point 3 of the TC:
"Maximum" EP values of the annual calculation indicator of demand for unrenewable primary energy for heating, ventilation, hot tap water and cooling, depending on the A/Ve building shape coefficient, amount to:
1) in residential buildings – for heating and ventilation, as well as for hot tap water (EPH+W) in a year:
a) for A/Ve ≤0.2; EPH+W = 73 + ΔEP; [kWh/(m2 . year)],
b) for 0.2 ≤ A/Ve _ 1.05; EPH+W = 55 + 90 · (A/Ve) + ΔEP; [kWh/(m2 . year)],
c) for A/Ve ≥1.05; EPH+W = 149.5 + ΔEP; [kWh/(m2 . year)]
where:

ΔEP = ΔEPW – addition for unit demand for unrenewable primary energy for hot tap water per year,

ΔEPW = 7800/(300 + 0.1 · Af); [kWh/(m2 . year)],

A –the sum of areas of all partitions of a building, which separate the heated part of the building from external air, ground and adjacent unheated rooms, counted based on the external outline,

Ve –the cubic capacity of the heated part of the building, minus the arcades, balconies, loggia, galleries, etc., counted based on the external outline,
Af – heated useable area of the building (premises);
2) in residential buildings – for heating, ventilation and cooling, as well as for hot tap water (EPHC+W) per year:
EPHC+W = EPH+W + (5 + 15 · Aw,e/Af) (1 – 0.2 · A/Ve) · Af,c/Af; [kWh/(m2 . year)]
where:
EPH+W – value as per the relationship stated in point 1,
Aw,e – area of external walls of a building, counted based on the external outline,
Af,c – cooled useable area of the building (premises);
Af – heated useable area of the building (premises);
Ve – is the cubic capacity of the heated part of the building, minus the arcades, balconies, loggia, galleries, etc., counted based on the external outline;
3) in collective residence buildings, public buildings, and manufacturing buildings - for heating, ventilation and cooling, as well as for hot tap water and built-in lighting (EPHC+W+L) per year:
EPHC+W+L = EPH+W + (10 + 60 · Aw,e/Af) (1 – 0.2 · A/Ve) · Af,c/Af; [kWh/(m2 . year)]
where:
Aw,e – area of external walls of a building, counted based on the external outline,
Af,c – cooled useable area of the building (premises);
EPH+W – value as per the relationship specified in point 1, where EP = EPW + EPL,
EPW – addition for unit demand for unrenewable primary energy for hot tap water per year; for the building with separated parts with different usable functions, a mean value of EPW is specified for the whole building, where:
EPW = 1.56 · 19.10 · VCW · bt/a1; [kWh/(m2 . year)]
where:
VCW – unit consumption of hot tap water per 24 hours, [dm3/((reference unit) · 24 hours)) It should be obtained from design assumptions,
a1 – share of Af surfaces per reference unit, usually per person [m2/reference unit], is to be obtained from design assumptions,
bt – undimensional time of use of a hot tap water system per year, is to be obtained from the design assumptions.
In the case of lack of the values in the design assumptions, they are to be accepted based on the following table:[...]

EPL – addition for unit demand for unrenewable primary energy for the lighting built in during the year (this pertains to public buildings); for the building with separated

parts with different usable functions, a mean value of EPW is specified for the whole building, where:
EPL = 2.7 · PN · t0/1000; [kWh/(m2 · year)]
where:[...]
For renovated buildings, without defining the scope of renovations, these values may be higher by 15%.
* The word “Maximum” is misleading, because it suffices if external partitions meet the requirement of $U \leq U_{max}$, and buildings constructed with partitions with U values consistent with the TC have much higher EP_{H+W} values.

REQUIREMENTS FOR INDOOR QUALITY

Please describe whether there are certain requirements for indoor quality included in the certification process.
There are no such criteria resulting from the TC. In particular, the requirement of resistance to overheating in summer is quality-related and only pertains to new buildings.

OFFICIAL PERMISSION

Describe where and when the certificate should be presented for approval of an official authority.
The certificate does not ever need to be presented for approval and there are no methods or tools for its verification. As a matter of fact, each certificate prepared in accordance with ROC fulfils the requirements of Art. 5, point 6 of Construction Law: Energy performance certificate including untrue information about the amount of energy, is a physical defect of a thing, within the understanding of the provisions of the Act of 23 April 1964 – Civil Code (Journal of Laws No. 16, item 93, as amended) on guarantee for defects.

The need to present the certificate arises only in the case of obtaining a certificate of occupancy. In other cases specified in Art. 5 point 3 and Art. 7 of EPBD I, i.e. for renting or sales, the Ministry of Infrastructures informed on its websites that the failure to comply with these provisions does not generate any punishing measures.

MARKET SIZE

- Amount of certifying experts
  In Poland, a few hundred thousand people have the right to issue certificates – they are, under the law, all construction engineers and engineers from industries associated with construction who have any construction

authorization, as well as people with MA who completed one-year postgraduate studies in the appropriate scope, and those with MA who completed a proper training and passed a state exam. In this group, no more than a few thousand people have the actual qualifications
Average prices in the market for certificates for

Single-family houses

- In the absence of any verification instruments or audits, and as a result of defects in the very ROC, certificate prices for single-family houses start at € 15.
- Certificates of multifamily houses may be obtained for € 50
- Prices for certificates for offices are difficult to determine because there is no demand for them, and therefore these transactions are concluded through planning and design firms, often in violation of the principle of independence.

DESIGN OF THE CERTIFICATE

Describe and show the certificate design. Try to assess its marketing potential and clarity.

The aim of certificate's creators was to deprive it of any marketing potential, and this aim was achieved

1.1. PRACTICAL PROBLEM

Please describe the problem of the energy certification system used in your country

In Poland there is no certification system compliant with EPBD I, and this is the only problem

1.2. TIME PLAN

In contrast to the EPBD I preparation, where the initial works were performed with wide-ranging public consultations (Energy Conservation Foundation, National Energy Conservation Agency and others), and regulation drafts were published at the website of the Ministry of Infrastructure, which allowed to indicate a distinct mark of the intervention of institutions and organizations opposed to the introduction of the directive. The current works over EPBD II are performed solely by the Department of

Construction Market and Technology, and there are no published information about the effects of these works.

In accordance with the plan of adapting the methodology to appendix No. 1 of the 2010/31/EU directive; corrections related to amending the contents of energy performance certificates; taking into account the current stage of normalization; correction of the existing provisions, taking into consideration their past functioning. The preparation of the regulation draft was divided into II stages: stage 1 – preparing the concept and assumptions for methodology, until 17 December 2010. The results of stage 1 have not been published
and stage 2 – preparing the methodology, rules and manner of calculating the energy performance until 15 November 2011.

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OTHER INFORMATIVE INDICATORS

(Describe if there are any other informative indicators used in your country in order to provide further information for customers, especially about costs associated with it.)

There are no other indicators in Poland, and, truth be told, there are no indicators to inform consumers, especially about costs associated with it. On the contrary, there exists a system of misinformation which misleads consumers. Starting with the certification system which, prepared in accordance with the ROC, provides false information about energy consumption, to fundamental misinformation in the form of TC. They have been changed, so that it's possible to largely decrease the construction costs at the cost of energy standard. These changes are, above all, elimination of the "collective residence buildings" and replacing it with the general category of residential buildings. As a result, legal restrictions on energy consumption by these buildings were eliminated. Until now, obtaining satisfactory profits in the multi-family housing market required forging the design documentation and stating false values of the index of seasonal energy demand for heating, "E". According to the research of the Polish Building Research Institute, it was common practice. Currently, there are no restrictions on heat demand for heating multifamily buildings. It suffices if the „U" heat conductivity coefficients satisfy the requirements of the Annex to the "Regulation on technical conditions to be met by buildings and their location" (hereinafter referred to as TC).

In the TC of 2002, this situation only referred to single-family housing for which the "E [kWh/m^{3}year]" index did not need to be calculated if the building partitions corresponded to the "U_k" values from the table that was the annex to the TC. Numerous simulations were performed then, which indicated that in single-family houses built with partitions in accordance with the TC, the E indicator was over 50% greater than the border value of E_0. The amendment to the TC included some cosmetic changes of the values of the "U" coefficient, and one revolutionary change in its definition. This revolution was the replacement of the thermal conductivity "U_k" coefficient, which took into account partition thermal bridges, with the "U" coefficient, i.e. without taking them into account. This is of vital importance for construction costs and heat demand. Elimination of thermal bridges both increases the construction costs and reduces the demand for energy. Accepting the border value of coefficient U = 0.3 [W/m2K] in the amended version of the TC, may mean that the coefficient value U_k= 1.16 [W/m^{2}K] in the previous TC version, which indicator was in effect since 1966. Another advantage of the new TC for the heating sector, is making the limit on window area contingent upon the heat transfer coefficient higher than U=1.5[W/m^{2}K], with

the lowest energy standard for windows in the market amounting to U_w=1.4[W/m^{2}K]. The elimination of the limit on the heat demand for heating multifamily buildings means the elimination of restrictions on the surface of glass windows in the fashionable “glass” apartment buildings.

At the same time, it decreased the costs of building such houses, because the absolute restrictions, effective until 2008, on the value of the indicator of heat demand for heating - “E[kWh/(m^{3}year)]” forced the use of energy-saving windows, which are much more expensive. At the same time, such buildings require much more energy for heating and cooling. In order to complete the list of all advantages for the energy sector and developers brought by the introduction of the 2002/91/EC directive in Poland, the normative coefficient of heat transfer through ground floor should be noted. As long ago as in 2002 in the TC, its value amounted to U_k=0.6[W/m^{2}K], i.e. higher by 50% from the heat transfer coefficient for external wall, although the difference between the internal temperature and the mean heating season temperature, amounts to about 0.6 of such difference for ground temperature. Thus, in order to maintain the proportional share of losses through the floor, this coefficient should amount to U=0.5[W/m^{2}K]. The significance of this difference may be understood if we take into consideration the fact that floor on the ground is the only construction partition which may not be subjected to thermal efficiency improvement. A high share of floor on the ground in the energy balance of a building means a decent minimum of demand for energy for a building undergoing thermal efficiency improvement. In the CT from November 2008, the value of heat demand indicator was changed from U=0.6[W/m^{2}K] to U=0.45[W/m^{2}K]. In order to weaken the effects of this change, the share of energy transfer through ground floor (~36%) was radically decreased in the “Certification Regulation”, by taking twice into account the temperature difference between the mean heating season temperature and the mean ground temperature,. Once as the equivalent coefficient of heat transfer U equiv,bf, in accordance with the PN-EN 12831:2006 standard, and the second time – as the temperature difference reduction coefficient btr,i=0.6.
Also, it should be appreciated that the Government made the effort to reduce the negative for the turnover of the energy production sector of the “2006/32/EC Directive” mentioned in the introduction. After twenty drafts of the act, it was finally adopted in the version which, through degree of complication and end-user, should limit, to the minimum level, the drop in demand for energy. At the end of this discussion of the results and achievements of the Government in securing, in terms of legislation, the demand for energy, I will present the most important provisions here, i.e. §328 and 329 of the TC.

Paragraph 328.1. of the TC reads as follows: “The building and its heating, ventilation, cooling and hot tap water installations, and in the case of a public building – also built-in lighting installation, should be designed and constructed in such a way that the amount of heat, coolness and electrical energy required to utilize the building in accordance with its dedication, may be kept at a rationally low level.” The term “rationally low level” in everyday understanding must mean the optimum level in terms of costs, defined in art. 2 point 14 of the “2010/31/EC Directive” – “it means the level of energy performance resulting in the lowest cost, during the estimated economic lifecycle, where:

a) the lowest cost is determined taking into account the investment costs, maintenance costs and operating costs associated with energy [...]”.

In turn, §329.1. of the TC states that “Requirements determined in § 328 item 1 are deemed satisfied for a residential building if:

1) the external partitions of a building and the installation technology meet the requirements of thermal insulating power, and the area of windows meets the requirements specified in point 2.1 of Appendix No. 2 to the regulation [...]". In the table in the appendix, the maximum heat transfer coefficient values were specified for: external walls U=0.3[W/m^{2}K], roofs U=0.25 [W/m^{2}K] and floors on the ground U=0.45[W/m^{2}K]. As follows from the contents of §329 of the TC, these values meet the requirement of "rationally low level" of demand for energy for heating residential buildings. The significance of this provision should not be underrated for the increase of demand for heat, because the values of these coefficients, at current costs of energy and insulation materials, are over three times higher than the "optimum level in terms of costs" in accordance with the TC. The decision of the Minister of Infrastructure on stating untrue information in the regulation, mainly about the rationality of heat transfer coefficients of construction partitions, was doubtlessly aimed at ensuring a high level of profits at developers' market and at guaranteeing a high level of demand for energy. Its consequence is the construction of a dozen or so million of square meters of buildings per year, with impressive, for our times, demand for heat (about 100kWh/(m^2*year) on average). If the Minister of Infrastructure had complied with the EU Directives provisions, the demand for energy in new buildings could have been even five times lower. What is also important is that even though constructing low-energy buildings is very profitable for the buyer, thermal efficiency improvement of buildings constructed in accordance with the TC energy standard is completely unprofitable. This guarantees maintaining a demand for energy in these buildings, at this very high level, for the next decades.

Decreasing the admissible energy standard for buildings by amending the TC of 06 November 2008 had to cause higher demand for energy used in developers' apartments. This results from the "imperfection of the market, which makes it difficult to effectively use the final energy" – described in art. 1 of the "2010/31/EC Directive". This imperfection is the gap between expenditure and profits at the market of constructing apartments for sale. In the conditions where the value of a real property depends most of all on its location, the expenditure on increasing its energy standard is borne by the investor, while the profits on account of low maintenance costs – are enjoyed by the buyer. This "imperfection of the market" results in a situation where investors construct in accordance with the standards below them worse, hoping for the "leniency" of building inspectors.

In theory, people who build for themselves are not limited by these relationships, and so they should build according to the "optimum in terms of costs" standard. It is not so, however, and the reason for that may be found in the state authority, which declares that the heat transfer coefficient values stated in the TC are rational, and thus indicate that decreasing them is permissible but irrational. It is hard to question this authority, supported by competent scientific institutes, such as Polish Academy of Sciences and higher education institutions. Thus, practically 100% of constructed buildings have the energy standard much worse than the "optimum level in terms of costs".

The contents of paragraph 329 of TC is evidence of the determination of the Minister of Infrastructure. This is because this paragraph is inconsistent with:

§328 of the same TC; Art. 5 of Construction Law, and with Art. 5 of the Constitution of the Republic of Poland. It not only breaches the obligations made in the Treaty of Accession, but also introduces Directives in a different manner.

Economic analysis of renewable energy sources, cogeneration, central heating plant

There are no undergoing analyses of alternative energy sources, and the formal requirement of Construction Law in this scope is satisfied in the form of designer's declaration about economic unprofitability of such alternatives, not backed by any analysis.

METHODS

Describe briefly the methods used for energy performance certificates, with the use of at least the following points:

Data (only data from calculations based on drawings) vs. operation only measurement data)

The only data is design data and as-built documentation. For utilized buildings, there is even no obligation to provide information about energy consumption based on its meters.

ENERGY PERFORMANCE / EFFICIENCY REQUIREMENTS

There are no border requirements related to energy consumption in buildings. However, there exist reference values specified at a shockingly high level. In accordance with §329 point 3 of the TC:
"Maximum" EP values of the annual calculation indicator of demand for unrenewable primary energy for heating, ventilation, hot tap water and cooling, depending on the A/Ve building shape coefficient, amount to:
1) in residential buildings – for heating and ventilation, as well as for hot tap water (EPH+W) in a year:
a) for A/Ve ≤0.2; EPH+W = 73 + ΔEP; [kWh/(m2 . year)],
b) for 0.2 ≤ A/Ve _ 1.05; EPH+W = 55 + 90 · (A/Ve) + ΔEP; [kWh/(m2 . year)],
c) for A/Ve ≥1.05; EPH+W = 149.5 + ΔEP; [kWh/(m2 . year)]
where:

ΔEP = ΔEPW – addition for unit demand for unrenewable primary energy for hot tap water per year,

ΔEPW = 7800/(300 + 0.1 · Af); [kWh/(m2 . year)],

A –the sum of areas of all partitions of a building, which separate the heated part of the building from external air, ground and adjacent unheated rooms, counted based on the external outline,

Ve –the cubic capacity of the heated part of the building, minus the arcades, balconies, loggia, galleries, etc., counted based on the external outline,
Af – heated useable area of the building (premises);
2) in residential buildings – for heating, ventilation and cooling, as well as for hot tap water (EPHC+W) per year:
EPHC+W = EPH+W + (5 + 15 · Aw,e/Af) (1 – 0.2 · A/Ve) · Af,c/Af; [kWh/(m2 . year)]
where:
EPH+W – value as per the relationship stated in point 1,
Aw,e – area of external walls of a building, counted based on the external outline,
Af,c – cooled useable area of the building (premises);
Af – heated useable area of the building (premises);
Ve – is the cubic capacity of the heated part of the building, minus the arcades, balconies, loggia, galleries, etc., counted based on the external outline;
3) in collective residence buildings, public buildings, and manufacturing buildings - for heating, ventilation and cooling, as well as for hot tap water and built-in lighting (EPHC+W+L) per year:
EPHC+W+L = EPH+W + (10 + 60 · Aw,e/Af) (1 – 0.2 · A/Ve) · Af,c/Af; [kWh/(m2 . year)]
where:
Aw,e – area of external walls of a building, counted based on the external outline,
Af,c – cooled useable area of the building (premises);
EPH+W – value as per the relationship specified in point 1, where EP = EPW + EPL,
EPW – addition for unit demand for unrenewable primary energy for hot tap water per year; for the building with separated parts with different usable functions, a mean value of EPW is specified for the whole building, where:
EPW = 1.56 · 19.10 · VCW · bt/a1; [kWh/(m2 . year)]
where:
VCW – unit consumption of hot tap water per 24 hours, [dm3/((reference unit) · 24 hours)) It should be obtained from design assumptions,
a1 – share of Af surfaces per reference unit, usually per person [m2/reference unit], is to be obtained from design assumptions,
bt – undimensional time of use of a hot tap water system per year, is to be obtained from the design assumptions.
In the case of lack of the values in the design assumptions, they are to be accepted based on the following table:[...]

EPL – addition for unit demand for unrenewable primary energy for the lighting built in during the year (this pertains to public buildings); for the building with separated

parts with different usable functions, a mean value of EPW is specified for the whole building, where:
EPL = 2.7 · PN · t0/1000; [kWh/(m2 · year)]
where:[...]
For renovated buildings, without defining the scope of renovations, these values may be higher by 15%.
* The word “Maximum” is misleading, because it suffices if external partitions meet the requirement of $U \leq U_{max}$, and buildings constructed with partitions with U values consistent with the TC have much higher EP_{H+W} values.

REQUIREMENTS FOR INDOOR QUALITY

Please describe whether there are certain requirements for indoor quality included in the certification process.
There are no such criteria resulting from the TC. In particular, the requirement of resistance to overheating in summer is quality-related and only pertains to new buildings.

OFFICIAL PERMISSION

Describe where and when the certificate should be presented for approval of an official authority.
The certificate does not ever need to be presented for approval and there are no methods or tools for its verification. As a matter of fact, each certificate prepared in accordance with ROC fulfils the requirements of Art. 5, point 6 of Construction Law: Energy performance certificate including untrue information about the amount of energy, is a physical defect of a thing, within the understanding of the provisions of the Act of 23 April 1964 – Civil Code (Journal of Laws No. 16, item 93, as amended) on guarantee for defects.

The need to present the certificate arises only in the case of obtaining a certificate of occupancy. In other cases specified in Art. 5 point 3 and Art. 7 of EPBD I, i.e. for renting or sales, the Ministry of Infrastructures informed on its websites that the failure to comply with these provisions does not generate any punishing measures.

MARKET SIZE

- Amount of certifying experts
  In Poland, a few hundred thousand people have the right to issue certificates – they are, under the law, all construction engineers and engineers from industries associated with construction who have any construction

authorization, as well as people with MA who completed one-year postgraduate studies in the appropriate scope, and those with MA who completed a proper training and passed a state exam. In this group, no more than a few thousand people have the actual qualifications
Average prices in the market for certificates for

Single-family houses

- In the absence of any verification instruments or audits, and as a result of defects in the very ROC, certificate prices for single-family houses start at € 15.
- Certificates of multifamily houses may be obtained for € 50
- Prices for certificates for offices are difficult to determine because there is no demand for them, and therefore these transactions are concluded through planning and design firms, often in violation of the principle of independence.

DESIGN OF THE CERTIFICATE

Describe and show the certificate design. Try to assess its marketing potential and clarity.

The aim of certificate's creators was to deprive it of any marketing potential, and this aim was achieved

1.1. PRACTICAL PROBLEM

Please describe the problem of the energy certification system used in your country

In Poland there is no certification system compliant with EPBD I, and this is the only problem

1.2. TIME PLAN

In contrast to the EPBD I preparation, where the initial works were performed with wide-ranging public consultations (Energy Conservation Foundation, National Energy Conservation Agency and others), and regulation drafts were published at the website of the Ministry of Infrastructure, which allowed to indicate a distinct mark of the intervention of institutions and organizations opposed to the introduction of the directive. The current works over EPBD II are performed solely by the Department of

Construction Market and Technology, and there are no published information about the effects of these works.

In accordance with the plan of adapting the methodology to appendix No. 1 of the 2010/31/EU directive; corrections related to amending the contents of energy performance certificates; taking into account the current stage of normalization; correction of the existing provisions, taking into consideration their past functioning. The preparation of the regulation draft was divided into II stages: stage 1 – preparing the concept and assumptions for methodology, until 17 December 2010. The results of stage 1 have not been published
and stage 2 – preparing the methodology, rules and manner of calculating the energy performance until 15 November 2011.