



Jan Pejter  
ENVIROS  
Czech Republic

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## The Czech Republic: Impact, compliance and control of legislation

This paper aims to summarize how in the Czech Republic the implementation of the EPBD has changed the national EP requirements and has affected the building stock. It describes the national way of handling with EPBD compliance and control and identifies interesting approaches and possible bottlenecks.

### 1 > Impact of the EPBD on the national requirements

Energy assessment of buildings is not a new thing in the Czech Republic. Since 2001 there is a methodology for energy audits and certificates of building envelope in place. The energy audit (EA) is mandatory for all types of buildings with total energy consumption higher than 1,500 GJ per year. A part of the energy audit was also the energy certificate with a graphical scale, showing the thermal characteristics of the building envelope. Due to the energy auditing system a set of national requirements in terms of energy efficiency and indoor climate was adopted. Authorized energy auditors are the experts certified by the Ministry to conduct energy audits. Authorized energy auditors are registered on a List of Energy Auditors kept by the Ministry.

The EPC implementing regulation (published in 2007) of the Act (Energy Management Act incorporating EPB Directive - published in 2006) sets the minimum requirements for the energy performance of new buildings and existing buildings under major renovation.

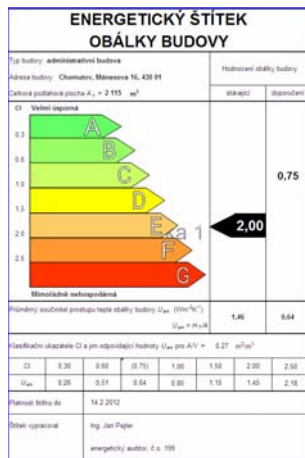
EP requirements for new and existing buildings are the same; it means that there is no difference in energy performance aspects of new or refurbished buildings.

The EPC regulation has adopted a majority of valid national standards (mostly in the form of prEN ISO) and other requirements (regulations, decree of the government e.g. on thermal insulation of hot water pipes, boilers efficiency, indoor climate) by references to these standards and regulations.

Main regulations are:

- › Regulation No. 148/2007 Coll. of the Ministry of Industry and Trade specifying the details of energy performance of buildings.
- › Level of heat energy demand according to Czech standard ČSN 73 05 040-2/Z1: 2005

Both specify details of energy efficiency in buildings. The required values are obligatory for almost all new buildings. In case of existing buildings they are obligatory for larger refurbishments (e.g. if more than 25 % of the



Energy certificate of building envelope

Major renovation means alteration to a completed building, which involves more than 25% of the overall surface area of the building shell, or a change of the technical equipment of the building that causes energy effects whose overall impact on initial energy consumption is higher than 25% of the overall energy consumption of the building.

surface of a building is insulated, then the insulation must comply with the standard). The standard sets two levels of insulation - required and recommended. The required level is obligatory; the recommended level reflects the expected development in the future.

Following the development of the required U-values in the Czech Republic no impact of the EPBD is shown on strengthening the thermal characteristics of the buildings envelope (last update of U-values was prepared and published in 2005).

U-value (W/m²K)	Since Jul 1964	Since Jan 1979	Since May 1994	Since Nov 2002	Since Jan 2006
Windows	-	3,700	2,900	1,800	1,700
Wall	1,467	0,894	0,461	0,380	0,380
Floor	1,369	1,091	1,034	0,600	0,450
Roof	0,900	0,508	0,316	0,300	0,240

- Regulation No. 150/2001 Coll. of the Ministry of Industry and Trade specifying the minimum efficiency of the utilization of energy in production, distribution and use of electric power and heat.

The regulation sets the minimum required efficiencies for electricity and heat production. In relation to the building sector the regulation covers all boilers with a heat capacity of over 200 kW. The specified efficiencies are obligatory for all new boilers.

The required minimal energy efficiency of the boilers (in %) is valid since 2001.

Thermal output of the boiler(s)	Coke	Hard Coal	Coal Pressed Fuel	Brown Coal - sorted	Brown Coal - unsorted	LFO	HFO	Natural Gas
up to 0,5 MW	69	68	67	66	62	80	-	85
0,51 - 3 MW	-	70	69	68	63	83	-	86
3,1 - 6 MW	-	75	-	72	65	84	81	87
6,1 - 20 MW	-	77	-	75	70	85	82	90
20,1 - 50 MW	-	80	-	-	77	87	85	92
above 50 MW	-	82	-	-	82	89	86	93

There are some new requirements directly connected with the EPBD implementation. The following requirements are considered as new features:

- Global minimum requirements on consumption for all types of buildings, expressed in kWh/m²year of delivered energy;
- RES (renewable energy sources) and DH (district heating) feasibility studies for new buildings over 1000 m²;
- Energy Performance Certificate (incorporating heating, cooling, DHW (domestic hot water) preparation, mechanical ventilation, lighting and auxiliary energy).

For the EP certificate the requirements are the same as stated in Article 7, no tighter or wider.

The EP certification is obligatory since 1st January 2009 for new buildings (larger than 50 m²) and existing renovated buildings (larger than 1,000 m²). Other buildings when rented or sold are provided with the energy performance certificate only if they are newly constructed or renovated.

Similarly, public buildings (larger than 1,000 m²) must display the EP certificate in a prominent place visible to the public only in case of a new construction or a major renovation.

Materials	Block of flats	Family houses	Total
Baked matter and profiled bricks	47%	58%	52%
Stones, baked matter bricks	13%	33%	23%
Concrete panels	37%	1%	19%
Other materials	2%	9%	5%
Total	100%	100%	100%

*The break down of residential buildings by the material of exterior walls.*

BUILDING ENERGY PERFORMANCE CERTIFICATE				
Building		Calculated building classification		
Address		As built	After energy saving measures	
Total floor area:				
Specific calculated energy use kWh/m <sup>2</sup> a		XY	XY	
Total energy delivered GJ		XY	XY	
Energy used by:				
Heating	Cooling	Ventilation	DHW	Lighting
XY%	XY%	XY%	XY%	XY%
Certificate validity		DD MM YYYY		
Certificate made by		Name Surname Licence Nr XY		

These national modifications strongly influence the scope of the Directive in the Czech Republic. It applies therefore only to new buildings and to renovated buildings over 1,000 m<sup>2</sup> of total floor area. The inconsistent implementation of the Directive leaves energy classes "D" to "G" entirely unused. Those are the buildings, which are assessed in terms of energy performance as poor and therefore requiring the implementation of saving measures. This limitation means that basically only EPC with class A to C are currently produced in the Czech Republic.

The average age of the housing stock is relatively high. In the year 2001 an average age of the housing stock was 46.9 years. A serious problem is the neglected maintenance of the housing stock, due to a lack of maintenance over a protracted period of time, which has resulted in a decrease of the financial and utility value of structures of residential buildings. Specific problems exist in respect of prefabricated-panel buildings. Due to construction and design flaws and insufficient maintenance, these problems are exacerbated by the fact that buildings of this type account for close to one third of the housing stock.

Since the beginning of the 1950s new technologies for a new type of residential building construction are used: the panel houses, which had been built till the end of the 20th century. Thermal resistance of the outside walls was 1.2-1.5 m<sup>2</sup>K/W (it represents an U-value of 0.83-0.67 W/m<sup>2</sup>K).

Despite the fact that most of the blocks of flats built in the period 1970-1990 used concrete panels as material of exterior walls, the majority of the currently used housing was built using bricks.

Energy performance is expressed by the total annual delivered energy consumption, including heating, cooling, DHW preparation, mechanical ventilation, lighting and auxiliary energy needed for standardised building operation.

Primary energy and CO<sub>2</sub>-emission are not assessed in the building energy certification. The discussion about primary energy coefficients was stopped at the beginning of the preparation of the EPBD implementation due to various interests of stakeholders (D-H companies, gas and electricity suppliers).

Table below shows energy classes (in kWh/m<sup>2</sup>a) for different building types. Class "C" is a minimum EP requirement level for new and renovated existing buildings.

Building Type	A	B	C	D	E	F	G
Single-family Houses	< 51	51 - 97	98 - 142	143 - 191	192 - 240	241 - 286	> 286
Apartment Blocks	< 43	43 - 82	83 - 120	121 - 162	163 - 205	206 - 245	> 245
Hotels & Restaurants	< 102	102 - 200	201 - 294	295 - 389	390 - 488	489 - 590	> 590
Offices	< 62	62 - 123	124 - 179	180 - 236	237 - 293	294 - 345	> 345
Hospitals	< 109	109 - 210	211 - 310	311 - 415	416 - 520	521 - 625	> 625
Education Buildings	< 47	47 - 89	90 - 130	131 - 174	175 - 220	221 - 265	> 265
Sports Facilities	< 53	53 - 102	103 - 145	146 - 194	195 - 245	246 - 297	> 297
Wholesale & Retail Trade Services Buildings	< 67	67 - 121	122-183	184 - 241	242 - 300	301 - 362	> 362

The same methodology is used for all regions and all building types in the Czech Republic. The recommended calculation procedure is based on published CEN Standards and applicable Czech Technical Standards.

The price of the residential buildings or apartments is not affected by the EPBD implementation, but rather by overheated real estate market.

## Overheated real estate market

*Until the mid of 2008 a demand exceeded supply on the market for new residential buildings. This meant enormous increase of real estate prices and focus on quickly as possible construction. This did not help to improve quality of the dwellings and the energy performance.*

*Due to the financial crisis, this situation is changing. But so far the only effect is less construction activity, no noticeable shift towards different construction style (e.g. higher quality or low-energy).*



Achieving the minimum EP requirement level should be possible by using standard building materials, as class “C” was determined in compliance with existing standards (introduced in 2006). The increase in prices should only be the result of the cost for processing the EP certificate. The document demonstrating compliance with the requirements for the energy performance of the building shall comprise an integral part of the documentation prerequisite to the planning permission for constructing a new, or renovating an existing building.

Experience with administrative or other types of buildings are currently not available due to the short validity of the Regulation, but generally there is no tightening of requirements on the energy performance of buildings.

The use of renewable energy sources is mentioned (for new buildings over 1000 m<sup>2</sup>) in the general EPBD law. The law requires that they must be the results of the assessment of the technical, environmental and economic feasibility of the alternative heating systems, which are:

- > decentralised energy supply systems based on renewable energy;
- > combined heat and power;
- > district or block central heating and cooling if applicable;
- > heat pumps.

It is not explicitly stated that using RES is mandatory, even after positive result of the assessment.

Further regulations to use RES in the building sector are not introduced.

The energy produced from renewable sources in the building is deducted from the energy delivered to the building.

Minimum ventilation requirements for all building types were set by the national standards, regulations and Ministry orders long before the EPBD implementation. This guarantees reduction of the increase in pollutants concentrations in internal building environment. The demands on the necessary quantity of supply of fresh air and other demands on the method of ventilation of rooms are given in special regulations depending on the character of operation of the building, the technological requirements and the physical activity of persons (e.g. National standard and the Order of the Ministry specifying air change rate requirements for dwellings, administration buildings, swimming pools and saunas, for operation of schools and pre-school facilities; the Decree of the government on health protection sets requirements for catering services).

Experts for building certification and inspections are authorised by the Ministry of Industry and Trade. The application may be submitted only by a person who:

- > has an Energy auditor registration number or
- > is registered as a Authorised architect or Authorised engineer and technician by the Czech chamber of certified engineers and technicians.

In the mid of 2009 there are about 280 authorised experts for EP certification in the Czech Republic.

## 2 > Compliance and control

Act 458/2000 Coll. - Law on Business Conditions and Public Administration in the Energy Sectors is known colloquially as the Energy Act. Although this is largely concerned with regulations in the energy sector, this Act also defines the responsibilities and powers of the State Energy Inspectorate

## Zelená úsporám

Within the Kyoto Protocol, the Czech Republic pledged to cut carbon dioxide emissions by 8% from 1990 levels. The country has managed to cut the emissions by as much as 24%. According to the EU statistics the Czech Republic continues to be one of the worst climate polluters in Europe (table of GHG per capita put the Czech Republic in fourth place).

It is planned to sell a part of the Czech Republic's carbon credit units to Japan. The Czech Republic has 150 million units available, while Japan needs more than 1 billion units. The Czech Republic is also holding talks about the units' sale with the Netherlands, Spain, Austria, New Zealand and Belgium, which need around 10 million units. The profit might reach € 950 million depending on the market price.

(SEI). This Act gives SEI the right of initiative to instigate inspection proceedings to ensure compliance with the Acts and Decrees related to energy generation, distribution and consumption.

The State Energy Inspectorate has specific responsibilities for Quality Control of EPC and inspections according to the requirements of the Energy Management Act. The Quality Control of EPC is additionally cofinanced by the state budget, through the State Programme (programme for energy efficiency).

SEI has the right to award penalties for failure to comply with the Act.

### Incentive policy

The Czech Republic has developed in the past few years a system of subsidies available for improvement of energy performance of buildings. The latest system is mostly concentrated on panel buildings and combines improvements of the static characteristics of such housing, with improvements of the energy characteristics.

In the residential sector the legislative/normative measures prevail, triggered by the introduction of the European Directives.

Investment subsidies in the framework of the Government Programme A (Ministry of Industry and Trade) and Government Programme B (Ministry of Environment) represent an important share. The part dealing with the residential sector supports the implementation of measures for reduction of the energy demand in apartment buildings, as well as the implementation of solar systems or heat pumps for space heating and DHW. 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 the submission, the bigger chance for grant).

A new incentive programme was launched in March 2009 (based on the Green Investment Scheme, paid out of revenues from emission trading). The programme supports the introduction of renewable energy, thermal insulation of single family and multi family buildings and construction of passive houses. Eligible applicant for the subsidy is a private owner of family and multifamily houses, housing associations and association of owners and municipalities. For the four-year period a budget of EUR 950 million is available.

### Certification market

The Ministry of Industry and Trade (MIT) is responsible for the certification scheme. The MIT authorises energy experts for certification schemes, keeps the list of authorised experts and annually collects experts' record (number of EPCs, energy saving potential, etc.).

Energy experts should be commercially insured for liability. If there are complaints on an experts' work, or if the expert does not process any audit or EPC for 5 years, he is deleted from the list of experts.

If, during the construction, or after the completion of a building, SEI finds out that the building doesn't comply with the EP requirements, the builder or the owner gets fined. By the law it is not clear whether the building will have to be subsequently brought into conformity with the requirements of the Act.

The organisational structure of SEI is divided into 11 regional branches with headquarter's in Prague. The total number of employees is about 160. SEI covers the whole power industry (electric power, heat and gas production

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and supply) with lasting considerable authority over both the suppliers and consumers side.

The State Energy Inspection employees are subjected to rules and in particular to independence and objectivity. The inspectors have to take a pledge in court and their personal responsibility can be charged.

The EP certificate/inspection may NOT be performed by a person who:

- > holds a share in the company or co-operative that ordered the EPC;
- > is a stakeholder in, or a member of the co-operative that ordered the EPC, or is a statutory body of, or a member of the statutory body of the entity that ordered the EPC, or is employed by, or has a similar relationship to the corporation that ordered the EPC;
- > is someone close to those people who might be, due to their position, a natural or legal person to influence the energy auditor.

The Energy auditors (the qualification required is a university degree and 3 years technical experience, or a "High school" degree + 5 years experience) and Authorised engineers or architects undertaking a specific training course and passing an examination, are authorized by the Ministry.

Experts in building certification, inspectors of boilers and AC systems have to pass different examinations, but the same expert can be simultaneously authorised to perform more than one of these activities.

Relevant state authorities such as building construction offices and municipality departments dealing with EPCs are well informed and educated about new requirements forced by EPBD legislation through periodical courses for personnel.

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