CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

Implementation of the EPBD Slovak Republic

Status in 2020

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NATIONAL WEBSITES
www.mindop.sk, www.inforeg.sk, www.tsus.sk, www.mhv.sk, www.siea.sk, www.sksi.sk

1. Introduction

Implementation of Directive 2002/91/EC in the Slovak Republic began on 1 January 2006 by way of Act 555/2005 for the Energy Performance of Buildings. Furthermore, Decree 625/2006 of the Ministry of Construction and Regional Development of the Slovak Republic entered into force on 1 January 2007. To obtain a building permit, designers had to present evidence proving that the energy rating of the designed building met the legal minimum performance requirements. Minimum performance requirements have been defined and established as mandatory since 1 January 2007. EPCs have been issued since January 2008. A new decree from the ministry came into force on 1 October 2009 introducing specific changes to the calculation process following European standards, and at that time, the template of the EPC was changed. As of 1 November 2010, the responsibility for the energy performance of buildings lies with the Ministry of Transport, Construction and Regional Development (MDVRR SR). The Ministry of Economy is responsible for the regular inspection of heating and AC systems in buildings.

Directive 2010/31/EU was transposed by Act 300/2012 on the energy performance of buildings, which amended and supplemented Act 555/2005. The new Decree 364/2012 entered into force in January 2013. This introduced the definition of NZEB, and the global indicator for total energy use in buildings was changed to primary energy use, which also altered the EPC template. The decree set out a gradual tightening of the minimum requirements for the years 2013, 2016 and 2021.

On 1 January 2017, an amendment of Decree 324/2012, which provides a new method for the energy certification of building units, came into force, introducing a change to some primary energy factors and presenting a new EPC template.

Directive 2018/844/EU was transposed by Act 378/2019 on the energy performance of buildings, which amended and supplemented Act 555/2005. The new act entered into force on 10 March 2020 together with Decree 35/2020, amending and supplementing Ministerial Decree 364/2012. A new template of the EPC was presented.

2. Current Status of Implementation of the EPBD

The implementation of the EPBD has led to a phased tightening of the minimum requirements for the energy performance of buildings. This tightening is based on the rate of construction of high energy performance buildings. These will be followed by NZEB requirements for all new buildings starting in 2021. Renovated existing buildings must meet the requirements for new buildings when technically, functionally and economically feasible.

Requirements on the U-value of building envelope components and the energy needed for the heating of buildings are set in the national standard (STN) for thermal protection. A consolidated version of STN 73 0540-2+Z1+Z2:2019 was published and came into force on 1 July 2019. The national standard set the gradual tightening of requirements in 2013. The fixed requirements of ultra-low energy buildings (Z1) were adjusted on 1 August 2016 for roofs and structures above the external open spaces following the results of phase 1 of cost-optimal studies on the levels of minimum energy performance requirements. Adjusted requirements for NZEB according to the results of the phase 2 of cost-optimal studies are contained in the consolidated version of the standard (Z2).

2.I. Energy performance requirements: NEW BUILDINGS

2.I.i. Progress and current status of new buildings (regulation overall performance)

Requirements for the energy performance of new buildings have been set since 2016. According to these, new buildings, including new public buildings, should fulfil the requirements set for ultra-low energy constructions and achieve the global indicator for energy class A1 (until the end of 2015, the requirement for low-energy buildings was energy class B). For all building categories and construction levels, a minimum air change rate of 0.5/h is required. Heat recovery systems with a minimal efficiency of 60% for the ventilation of spaces is further required. Starting 1 January 2021 new buildings should fulfil the requirements set for NZEB and achieve the global indicator for energy class A0. If the NZEB exports or stores energy, it is classified in subclass $A0^{+}$. The requirements for the global indicator for primary energy are set depending on the category of the building. New public buildings must fulfil NZEB requirements as of 1 January 2019. The requirements for building components are the same for residential and non-residential buildings.

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

The EPBD has been incorporated into the Slovak legal system (act and ministerial decree). RES and heat recovery are now mandatory in new buildings. Requirements for the thermal protection of the envelope components and buildings are presented in the national standard STN 73 0540-2+Z1+Z2:2019[1]. The revised standard (Z1) which came into force on 1 August 2016 and the consolidated standard which came into force on 1 July 2019 respect cost-optimality calculations. The process of the energy performance calculation is described in the Annex of the Ministerial Decree 364/2012[2] and refers to the standardised

calculation methods. The whole package of CEN standards was implemented and included in Slovak Technical Standards (STN). More than 50% of the CEN standards were translated into the Slovak language and issued as STN EN standards. All umbrella standards and related technical reports were translated into the Slovak language. At the time of writing this report, the last of the umbrella standards and those related to thermal protection intended for translation have been submitted for publication. The monthly method is currently used for calculating the energy performance. The calculations are worked out separately for thermal protection and for the energy use for heating, cooling and ventilation, as well as for hot water preparation and lighting. Calculating primary energy is based on calculated delivered energy and primary energy factors. Non-renewable primary energy factors are provided in the Ministerial Decree 324/2016[3], in force since 1 January 2017. The calculation procedure steps are described in the Ministerial Decree 35/2020[4], in force since 10 March 2020. The non-renewable primary energy factor for electricity decreased from 2.764 to 2.2. Primary energy factors for district heating should be calculated following the Ministerial Decree 308/2016[5].

2.I.iii. Action plan for progression to NZEB for new buildings

The national action plan for NZEB reflects the requirements and the streamlining of legal documents in order to implement NZEB standards. Milestones are presented as intermediate objectives and targets focused on 2016 (ultra-low level of construction and 2021 level of NZEB construction). The definition of NZEB has been transposed into law and extended by highlighting the importance of the efficient thermal protection of buildings. A definition of NZEB was written into law, in force since 2013. The energy used in NZEB should be to a large extent covered by RES. Implementing heat recovery systems/units with an efficiency higher than 60% is required in ultra-low and NZEB construction level. The construction of new public NZEB has been required since 1 January 2019. The national action plan requires that the design documentation for new public buildings should be in line with NZEB requirements when asking for a building permit as of 31 December 2018. For all new buildings, the date required for design documentation to be in line with NZEB requirements is 31 December 2020.

The action plan presents the gradual tightening of requirements with the global indicator for primary energy as the performance value. Energy class A1 has been required since 1 January 2016, whereas NZEB should achieve energy class A0 (when exporting or storing energy the classification can be $A0^{+}$) for the global indicator as a performance value, required starting 1 January 2021.

At present, there are only a few examples of completed NZEB in the country. Some buildings are in the design stage, reflecting the requirements for building envelope components, the global indicator for primary energy and implementing RES, heat recovery systems and smart metering systems. Some buildings were already classified as $A0^{+}$.

2.I.iv. Requirements for building components for new buildings

Building components for new buildings should correspond to the requirements set by national standard STN 73 0540-2+Z1+Z2:2019 for the building envelope, with separate values for external walls, roofs, windows and dividing structures between heated and unheated spaces. The revised standard (Z1), which came into force on 1 August 2016, and the consolidated standard, which came in force on 1 July 2019, are setting the gradually tightened requirements (Table 1).

Structure / component	U-value W/(m².K)				
	Maximum value	Standardised (required) value Low energy level of construction	Recommended value Ultra low-energy level of construction standardised (required)	Target value NZEB level of construction from 1 January 2021	
				standardised (required)	Recommended
	U_{max}	U_N from 1 January 2013	U_{r1} from 1 January 2016	U_{r2}	U_{r3}
External wall and pitched roof with a slope > 45°	0.46	0.32	0.22	0.22	0.15
Flat roof and pitched roof with a slope ≤ 45°	0.30	0.20	0.15	0.15	0.10
Windows, doors in external walls	1.70	1.40	1.00	0.85	0.65

Table 1. Requirements for the U-value of selected building envelope structures.

2.I.v. Enforcement systems new buildings

The basic law for construction is the Building Act 50/1976[6], as amended, to which the special Act 555/2005[7] on the energy performance of buildings is related. The Building Code requires compliance with the basic requirements for constructions and defines general technical requirements. The energy performance of buildings requirements should be taken into account.

The Building Code sets the requirements and conditions for achieving a building permit, which is issued by the building authorities for new constructions and renovations (changes for existing buildings). The Building Code stipulates the obligation of the builder/owner of a residential building (multi-family apartment building or single-family house) to submit an EPC for the building approval procedure. In the case of non-residential buildings, the owner is required to submit the EPC to the building authority within 6 months after construction completion at the latest.

The design documentation prepared as an annex to the building permit application must include the project energy assessment. The designer is required to prove in the design documentation for the building permit the assumption of meeting the requirements for energy performance. The designer must submit the result of the EPB calculations in the technical report for the design documentation. The Act on EPB defines the conditions that result from the implementation of the EPBD.

2.II. Energy performance requirements: EXISTING BUILDINGS

2.II.i. Progress and current status of existing buildings (regulation overall performance)

The building code states that all construction works must fulfil essential requirements. The gradual tightening of requirements for energy performance started in 2013. From 2016, major renovations had to meet the requirements for ultra-low energy construction, namely energy class A1, if technically, functionally and economically feasible. To meet the requirements for the global indicator for primary

energy, a major renovation of technical building systems is also needed. Deep renovation also includes changes to the technical building systems, including changes connected to the heat and hot water generation and distribution. In case it is not possible to change the efficiency of the device (e.g., the owner of the renovated building is not able to influence the primary energy factor), the renovated building must meet energy class A for the total energy use of the building. The energy rating is focused on technical building systems for heating and domestic hot water preparation when residential buildings are renovated, as well as for cooling, ventilation and lighting when non-residential buildings are renovated. From 2021 (2019 for public buildings), major renovations have to meet the requirements for NZEB construction, namely energy class A0, if technically, functionally and economically feasible. To meet the requirements for the global indicator for primary energy, deep renovation is needed, including heat recovery and the use of RES. Measures implemented should be cost-effective where possible. The payback time of the measures proposed in the EPC should be less than 15 years.

2.II.ii. Regulation on individual parts, distinct from whole building performance

Ministerial Decree 324/2016 sets the methodology for evaluating individual parts of buildings (building units/apartments). It allows for classifying an individual part of the building according to the evaluation results as five different levels of construction in accordance with the scale adopted for the entire building (low-energy, ultra-low-energy and nearly zero energy). The assessment is performed for individual building structures of the building envelope, taking into account the position of an individual part in the building, and compares it with the requirements for envelope building elements according to STN 73 0430-2 + Z1 + Z2: 2019.

Requirements for the evaluation of the heating system are set for individual levels of construction, depending on the method of the control system and hydraulic balancing of the system (Table 2). The evaluation of the DHW system is performed according to the type of batteries and the distance between the DHW supply shut-off valve and the farthest battery, as well as by comparing the actual and required thermal insulation thickness of DHW distributions in the individual part of the building. For example, an individual part of the building meets the requirements for nearly zero energy if there is a smart control system of the heating system installed and DHW distributions are insulated using thermal insulation with a thickness over the diameter of the pipe.

Heating system	Level of construction				
	Buildings with low energy performance (existing buildings)	Construction of low level of energy savings	Low energy level of construction	Ultralow energy level of construction	NZEB Level of construction
	Score				
	1	2	3	4	5
Control system and hydraulic balancing of the system	without hydraulic balancing of the system	hydraulic balancing, without thermostatic valves	hydraulic balancing, thermostatic valves	hydraulic balancing, thermostatic valves, heat recovery	hydraulic balancing, smart control system, heat recovery
Sum of points	1	2	3	4	5
Evaluation	☹--	😐	☺	☺+	☺++

Table 2. Evaluation of the building part heating system.

2.II.iii. Initiatives/plans to improve the existing building stock

The first draft of the Slovak 'Strategy for the renovation of the residential and non-residential building stock' towards improved energy efficiency, prepared under Art. 4 of the Energy Efficiency Directive (EED), was approved by Government Resolution 347/2014 (in July 2014). The renovation of buildings should continue for a total of 29,000 apartment building units and 22,000 family houses annually, thus targeting a large proportion of the building stock constructed during the period of 1948-1992. By the end of 2018, 64.70% of apartment units in multi-apartment buildings and 40.71% of single-family houses had been renovated. The majority of renovated buildings followed the minimum energy performance requirements valid at the time of carrying out the construction works. In the future however, a deeper deep renovation process including increased efficiency will be necessary in many cases. This includes improvements of major technical building systems as well.

In compliance with the EED, energy audits have been carried out on buildings owned by the central government and were accompanied by progressive design documentation for building permits. Renovation works are generally financed using EU structural funds. Since 2016, the statistical data for the renovation of non-residential buildings have been available based on the approval procedures provided by the Statistical Office of the Slovak Republic.

2.II.iv. Long Term Renovation Strategies, status

The strategic document 'Update of the Strategy for the rehabilitation of the residential and non-residential building stock' prepared under Art. 4 of the Energy Efficiency Directive was approved by Government Resolution 230/2017 (adopted in May 2017). The new Long-Term Renovation Strategy for the rehabilitation of the building stock, prepared under Art. 2a of Directive 844/2018, is based on the approved document and includes updates related to this amending EPBD. There are some new elements (assessment of the CO_2 emissions in the building sector, milestones for the renovation, update on the statistical data in the non-residential building stock, etc.) that help to shape a vision and strategy of how to transform the current building stock in Slovakia into a decarbonised and highly energy efficient building stock by 2050.

Policies and actions already in place have proved successful in boosting the renovation of the apartment blocks. Measures adopted in relation to the support of the renovation of the family houses and non-residential buildings provide a good basis for accelerating renovations in the future. The strategy puts emphasis on implementing the cost-effective deep renovation of the building stock, increasing the rate of renovation in the non-residential sector as well as for family houses, and at least keeping the rate of renovation of apartment blocks stable. It is inevitable that sufficient financial sources (including EU funds) for the deep renovation of buildings will need to be earmarked in the next decade in order to meet the milestones set in the LTRS.

2.II.v. Financial instruments and incentives for existing buildings

Since 1997, the main financial tools supporting the renovation of residential buildings have been provided by the State fund for the development of the housing stock (SFRB). The conditions for credits are set in Act 150/2013[14] as well as ministerial decrees determining the type and height of provided credits and subsidies. Financial tools focus on multi-family houses. The total amount of credits for the period of 2006-2019 represents 1.33 billion € for the renovation of 299,151 apartments. Funding of single-family houses from SFRB was at a very low level. In order to increase the interest of owners to undertake major renovations of single-family houses (ensuring energy savings), a new programme was set up in 2016

targeting the low level of renovated existing single-family houses (40.71%)[15]. As of May 2019, the highest possible grant is 8,800 € per single-family house.

The renovation of public buildings since 2015 has been additionally supported by the subsidies provided by Envirofond. The subsidy is granted from the sale of greenhouse gas emission quotas. In the period of 2015-2019, an amount totalling 388 million € has been distributed. Other possibilities to cover the funding of public buildings are the usage of own financial resources and from 2019 by using a tool for guaranteed energy services.

The 'Green for households' project[16] is focused on subsidies for PV systems, solar thermal collectors, biomass boilers and heat pumps. Until now, approx. 23,400 systems were supported with a total grant amount of 41.25 million €.

EU structural funds are generally used for the renovation of both non-residential buildings[17] and public non-residential buildings[18].

2.II.vi. Information campaigns / complementary policies

Information campaigns are organised through TV specials (broadcasted monthly on public service channel), focusing on energy certification, measures recommended for major and deep building renovations, construction products, as well as information about technical building systems and components. Similarly, there are also radio broadcasts focusing on energy certification. Information about the energy performance of buildings is available at *www.mindop.sk*. There are already some ongoing information campaigns and professional advice activities, e.g. 'Live with Energy'[19] and 'Efficient with energy'[20], organised by the Slovak Innovation and Energy Agency (SIEA). In cooperation with SIEA, the private channel TA3 prepares, as of mid-2019, a monthly television report on the usage of devices utilising renewable sources and the efficient use of energy.

2.III. Energy performance certificate requirements

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

The number of sold and rented buildings with EPCs increases from year to year, but nevertheless the overall proportion of the total building stock with EPCs is very low. The total number of issued EPCs in 2019 was 17,801 (Figure 1), in 2018 – 17,132 and in 2017 – 15,896. EPCs issued each year for new and renovated buildings represent more than 95% of all yearly issued EPCs. More than one third of the total EPCs issued yearly originate from the Bratislava and Trnava regions in western Slovakia. The summary of issued EPCs as regards building categories and energy classes is presented in Table 3.

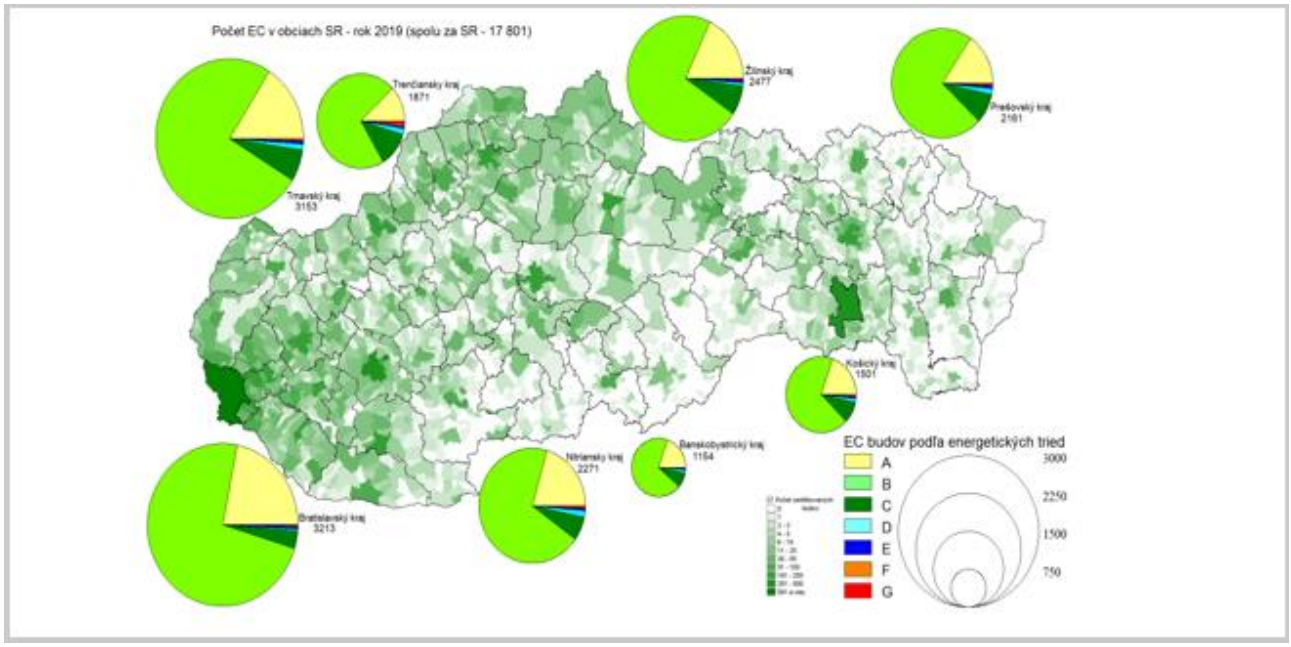
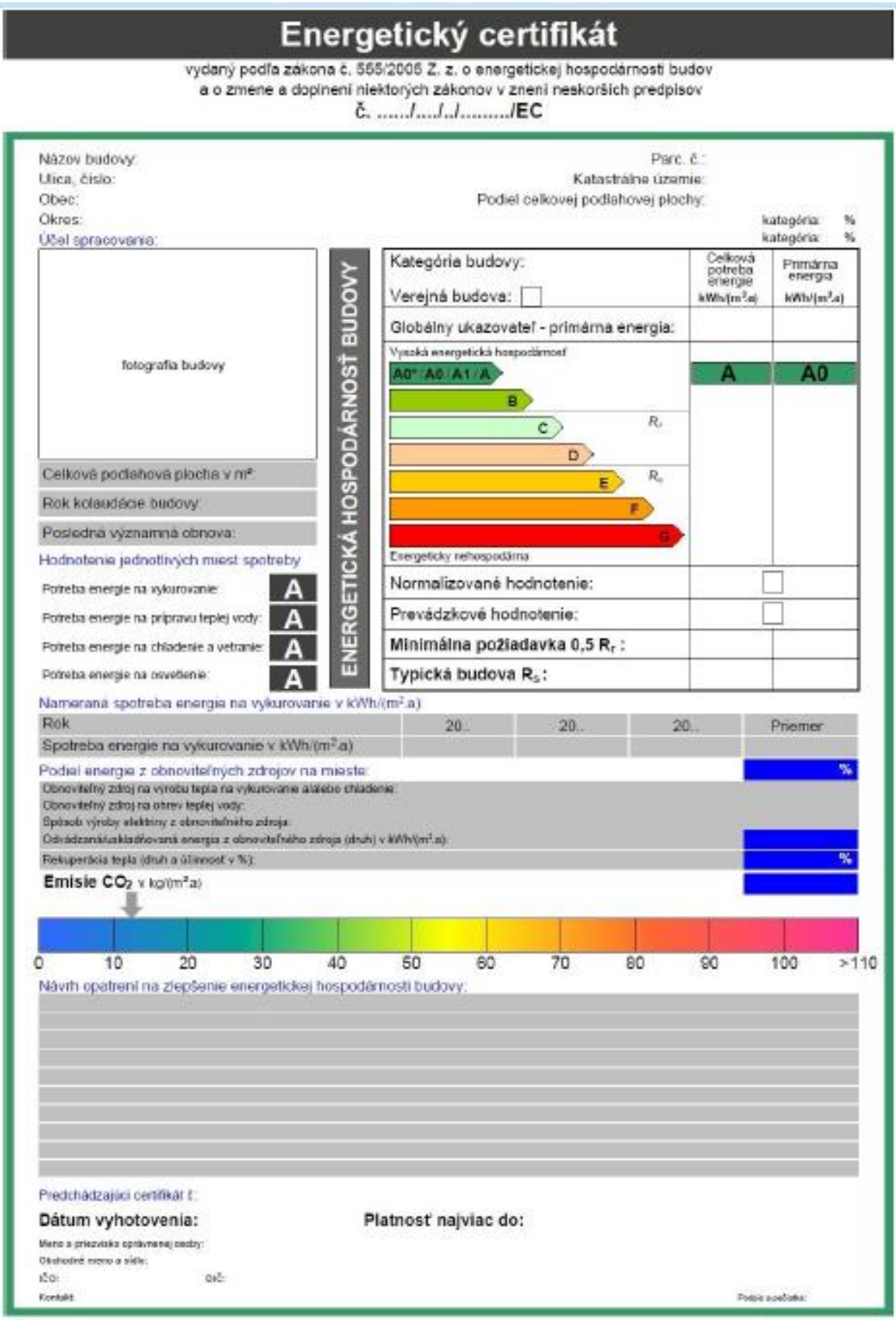


Figure 1. The number of EPCs in different regions of the Slovak Republic in 2019.

Building category	Total number	Energy class								
		A0	**A1**	**B**	**C**	**D**		**E**	**F**	**G**
Single-family houses		**14,882**	2,910	9,645	2,098	182	33	8	5	10
Multi-family houses		**1,221**	221	567	378	50	3	1	1	-
Office buildings		**621**	72	323	165	40	11	7	2	1
Educational buildings		**309**	18	148	93	24	13	3	5	5
Hospitals		**32**	-	15	12	3	-	1	1	-
Hotels and restaurants		**125**	9	75	34	3	3	-	-	1
Sport facilities		**39**	1	22	10	1	2	-	1	2
Wholesale and retail services buildings		**388**	42	212	112	18	3	1	-	-
Other buildings		**184**	16	104	54	6	3	1	-	-
Total		**117,801**	**3,289**	**11,111**	**2,956**	**327**	**71**	**22**	**15**	**10**

Table 3. Summary of data on performed EPCs in 2019 according to building categories and energy classes.

Ministerial Decree 35/2020, which amends and supplements Ministerial Decree 364/2012 as amended by Decree 324/2016, introduces the energy class $A0^+$. The energy performance certificate template consists of 8 pages and the maximum validity of issued EPCs is 10 years. It includes the EPC identification number, basic identification data on the building including photograph, global indicator primary energy, evaluation of each place of consumption, measured data for energy consumption for heating for the last three years, share of renewable energy produced on-site, CO_2 emissions, the draft measures for improvement of energy performance of the building, date and contact details of the authorised person issuing the EPC and the expiry date of the EPC.



Energetický certifikát

vydaný podľa zákona č. 555/2005 Z. z. o energetickej hospodárnosti budov
a o zmene a doplnení niektorých zákonov v znení neskorších predpisov
č. ...../...../..../...../EC

Názov budovy:
Ulica, číslo:
Obec:
Okres:
Účel spracovania:

Parc. č.:
Katastrálne územie:
Podiel celkovej podlahovej plochy:
kategória: %
kategória: %

fotografia budovy

Celková podlahová plocha v m²
Rok kolaudácie budovy:
Posledná významná obnova:

ENERGETICKÁ HOSPODÁRNOSŤ BUDOVY

Kategória budovy:	Celková potreba energie kWh/(m²a)	Primárna energia kWh/(m²a)
Verejná budova: ☐		
Globálny ukazovateľ - primárna energia:		
Vysoká energetická hospodárnosť A0* A0 A1 A	A	A0
B		
C R_r		
D		
E R_s		
F		
G		
Energeticky nehospodárna		
Normalizované hodnotenie: ☐		
Prevádzkové hodnotenie: ☐		
Minimálna požiadavka 0,5 R_r :		
Typická budova R_s:		

Hodnotenie jednotlivých miest spotreby

Potreba energie na vykurovanie:	A
Potreba energie na prípravu teplej vody:	A
Potreba energie na chladenie a vetranie:	A
Potreba energie na osvetlenie:	A

Nameraná spotreba energia na vykurovanie v kWh/(m².a)

Rok	20..	20..	20..	Priemer
Spotreba energie na vykurovanie v kWh/(m².a)				

Podiel energie z obnoviteľných zdrojov na mieste: %
Obnoviteľný zdroj na výrobu tepla na vykurovanie alebo chladenie:
Obnoviteľný zdroj na ohrev teplej vody:
Spôsob výroby elektriny z obnoviteľného zdroja:
Odvádzaná/uskladňovaná energia z obnoviteľného zdroja (druh) v kWh/(m².a):
Rekuperácia tepla (druh a účinnosť v %): %

Emisie CO_2 v kg/(m².a)

0 10 20 30 40 50 60 70 80 90 100 >110

Návrh opatrení na zlepšenie energetickej hospodárnosti budovy:

Predchádzajúci certifikát č.:

Dátum vyhotovenia: **Platnosť najviac do:**

Meno a priezvisko oprávnenej osoby:
Obchodné meno a sídlo:
IČO: DIČ:
Kontakt: Podpis a pečiatka:

Figure 2. First page of the EPC template for residential, non-residential and public buildings.

2.III.ii. Quality Assurance of EPCs

Since 2014, the Slovak Trade Inspection, has been responsible for the quality assurance of EPCs. It also has the right to act against the building owner and against the person authorised to issue the EPC. Random control is performed by means of central information system. The online web interface controls the data inputs for each individual EPC submitted, up to a certain level.

2.III.iii. Progress and current status of EPCs on public and large buildings visited by the public

Energy certification and display is mandatory for buildings used by public authorities with a total floor area of more than 250 m^2 (until 9 July 2015 it was for more than 500 m^2) or for buildings that are frequently visited by the public.

The Slovak Trade Inspection is in charge of checking that EPCs are publicly displayed.

The format and content of the EPC for public and large buildings that are visited by the public are the same as for other buildings. EPCs for public and large buildings visited by the public are valid for 10 years unless the building is renovated and there is a change in the energy use.

As of 2020, Decree 35/2020 introduces an obligation to indicate on the EPC when a building is a public building, both for statistical purposes and for the purpose of recognition in the database.

2.III.iv. Implementation of mandatory advertising requirement – status

Act 555/2005[7] on the energy performance of buildings implements mandatory advertising requirements which have been in force since January 2013. In cases where the building or its part is sold or rented, the global indicator of the integrated energy performance from the EPC must be mentioned as part of the offer. This obligation is also valid for real estate services. The Slovak Trade Inspection is in charge of control checks. Both the owner of the building or its part and the natural or legal person offering the real estate service may be fined in accordance with Act Nr. 555/2005 if they fail to comply with this obligation.

2.IV. Smart buildings and building systems

2.IV.i. Status and plans on smart buildings

There is no definition of smart buildings and no decision on specific policies for smart buildings as of yet.

2.IV.ii. Regulation of system performance

There are no regulations defining the minimum efficiency of any technical building system as a whole. There are only specific requirements in regulations related to individual elements (e.g., boilers, pipework insulation, etc.). Technical building system requirements are mainly based on European (EN) or national (STN) standards. There are minimum requirements set for heating, cooling and ventilation, as well as for domestic hot water. In addition, according to Act 555/2005, building designers must assess the possibility of technical, environmental and economic utilisation of high-efficiency alternative energy systems (active solar heating systems and other heating systems and electrical systems based on RES; combined heat and power; district or block heating and cooling) before the construction begins. Health and safety requirements have higher priority than other, e.g. technical, requirements. The energy requirements are to be achieved if it is functionally, technically and economically feasible.

There are no specific technical requirements for system installations as a whole in either new or renovated buildings. New and existing buildings must only meet global minimum energy performance requirements. Regulations 422/2012[9] and 328/2005[10] define the minimum combustion efficiencies of boilers. Act 321/2014[8] on energy efficiency obliges owners of buildings with a total floor area larger than 1,000 m^2 to ensure that a distribution network of heat and domestic hot water is installed using suitable thermal insulation. Regulation 282/2012[8] defines those technical requirements.

Regarding other products used in technical building systems, specific requirements are to be found in implementing regulations related to the Ecodesign Directive. In addition, there are specific requirements set in Act 321/2014, depending on the size of the building. The owner of a building with a total floor area larger than 1,000 m^2 with a water-based central heating system or central domestic hot water generation is required to:

- ensure and maintain hydronic balancing of the heating system in the building;
- equip the heating system with equipment used for the automatic control of heating medium parameters for each heating appliance depending on the air temperature in heated rooms with the long-term stay of occupants;
- ensure and maintain hydronic balancing of the domestic hot water distribution system in the building.

After completing the works in a building, the owner should have performed the above-mentioned technical measures; this is one of the conditions for obtaining a building permit. In the case of non-compliance, the owner could be fined 300 € to 1,000 € if detected by the Slovak Trade Inspection officials.

According to amended Act 555/2005, if it is technically and economically feasible, the owner of the building is mandated to equip the new building with self-regulating devices for individual regulation of the internal temperature in each heated room and in each heated separate part. The owner is also requested to equip the heated rooms of the existing building and the heated existing individual parts with self-regulating devices when replacing the heat source (e.g., boiler). In order to optimise the use of energy by technical building systems, the Ministry of Transport and Construction has the competency to prepare regulations which determine the system requirements for overall energy efficiency, correct installation and appropriate dimensioning as well as the setting and regulation of technical building systems that are installed in existing buildings. For new, replaced and modernised technical building systems, it should be determined if their application is technically, functionally and economically feasible.

Table 4 is an example of requirements for individual technical elements.

Minimum thickness of thermal insulation of heat and hot water distribution pipes made from steel pipes for thermal insulating material with a thermal conductivity of 0.035 W/(m.K) at 0°C		
No.	Internal diameter of piping or fittings	Minimum insulation thickness
1	to 22 mm inclusive	20 mm
2	over 22 mm to 35 mm inclusive	30 mm
3	over 35 mm to 100 mm inclusive	the same as the internal diameter of the pipe
4	over 100 mm	100 mm
5	For heat distributors and heat collectors, in pipe crossings, in pipe joints and for pipes and fittings installed in wall and ceiling transitions, the minimum insulation thickness may be reduced by 50% of the insulation thickness specified in the relevant row of the table	

Table 4. Requirements for thermal insulation of pipes.

According to amendment of Act 321/2014, the obligation to equip automatic air temperature controls for the heating systems in heated rooms with long-term occupants will also be applied to the systems in the heated rooms of the common areas of the building. This obligation would be applied when replacing heat production or heat distribution equipment if technically possible and cost-effective.

2.IV.iii. Building Automation and Controls (BACs)

According to amendment of Act 321/2014, if technically possible and cost-effective, the owner of a non-residential building with a total effective thermal output of a heating system higher than 290 kW or a total effective cooling capacity of an AC system higher than 290 kW is required to equip the non-residential building with a building automation and control system. This obligation will be effective from 2025 onwards.

According to the amendment of Act 555/2005, during major renovation of the building, the building owner is required to apply new and renewed technical building systems, to implement intelligent metering systems and to install building automation and control systems, including monitoring systems aimed at saving energy, if it is technically, functionally and economically feasible.

Amendment of Act 555/2005 sets the obligation for the building owner to comply with the requirements for electromobility infrastructure as provided by the 2018 amendment of the EPBD. Each non-residential building with more than ten parking spaces has to be equipped with at least one charging point and ducting infrastructure for at least one in every five parking spaces. Furthermore, each new residential building and residential building undergoing major renovation with more than ten parking spaces has to be equipped with at least one charging point and ducting infrastructure for every parking space, under conditions laid down in the Act. There are no regulatory barriers in permitting and approval procedures that would impede the implementation of these requirements.

2.IV.iv. Status and encouragement of intelligent metering

Decrees 358/2013[12] and 168/2015[13] were adopted following a cost-benefit analysis of Distribution System Operators (DSOs). The decrees set that at least 80% of the delivery points for final customers whose annual electricity consumption is more than 4 MWh shall be equipped with an intelligent metering system (IMS) by December 2020.

The supplier of heat and domestic hot water is obliged to provide the customer with a meter that shows the actual heat consumption as well as the time of consumption. Similar obligations are also valid for gas supplies (especially medium- and large-use customers).

The Regulatory Office for Network Industries (RONI) encourages DSOs to accelerate the deployment of intelligent metering before the deadlines stated in Decree 168/2015, provide advice and information to customers, update the displayed measurement data frequently enough so they can be used to save energy, create, design and offer standardised interfaces, which would enable energy management in 'real time', and provide measurement results directly to the customer.

Intelligent metering does not in itself generate energy savings, since savings are generated by the actions of the occupants based on the information from the metering system; therefore, such systems are not part of the normalised energy performance calculation. As such, their installation does not influence the energy class of the building in the EPC or in the energy label.

According to the amendment of Act 555/2005, the owner of the building is required to equip the new building with self-regulating devices for individual regulation of the internal temperature in each heated room and in each heated individual part. The owner is also obliged to equip the heated rooms of the existing building and the existing heated individual parts with self-regulating devices when replacing the heat production equipment. In both cases, this obligation applies if the installation is technically and economically feasible.

2.IV.v. Progress and current status on heating systems (Inspection / Equivalence)

The Slovak Republic decided to use the option of regular inspections, both for heating and AC systems, in response to Articles 14/15 of the EPBD (Directive 2010/31/EU). There is an option for an equivalence report provided. Regular inspections were made mandatory on 1 January 2008. The Ministry of Economy is responsible for the area of regular inspection for both heating and AC systems in buildings. The legal basis for both follows from Act 314/2012. There are two linked decrees:

- Decree 422/2012, which lays down the requirements for the procedure of regular and extended inspections of heating systems and the regular inspection of AC systems;
- Decree 44/2013, which defines the details of the examination procedure that qualified experts need to follow in order to carry out the regular inspection of heating and AC systems.

There is a minimum amount of information required to be included in the inspection reports and a report template is provided by the SIEA. Act 314/2012 contains framework information on the content of the report which is then supplemented by Decree 422/2012. The training and examination procedures for qualified experts follow the same structure for both heating and AC system inspections. SIEA provides an additional support, while the Slovak Association for Cooling and Air Conditioning Technology provides experts qualified to perform AC inspections.

Inspections of heating systems are based on the assessment of efficiency under defined normal working conditions. Currently, inspections of heating systems must follow the reference methodologies, partially based on EN standards, (e.g. EN 15378-1). A detailed national methodology is defined in Decree 422/2012. The regular intervals of inspection depend on the thermal output of the heating system, the type of fuel and the type of building (residential/non-residential). All boilers under the scope of Act 314/2012 in all residential buildings with a nominal heat output of the boiler above 20 kW, except for those fuelled by natural gas, biomass and biogas, should be inspected; since 2014, boilers above 20 kW in non-residential buildings which have been fuelled by solid, liquid and gaseous fossil fuels (with the exception of natural gas) should be inspected as well (Table 5).

Nominal output of boiler [kW]	Fuel	Interval of regular inspection [year]	
		Single-family houses and apartment buildings	Office buildings, schools and educational buildings, hospitals, hotels and restaurants, sport facilities, wholesale and retail trade buildings, other types of energy-consuming buildings
In the range of 20 (incl.) to 30	Solid, liquid and gaseous fossil fuels except natural gas	10	7
	Natural gas	15 (first inspection at the latest in 31 Dec 2022)	12 (first inspection at the latest in 31 Dec 2019)
	Biomass, biogas	15	12
In the range of 30 (incl.) to 100	Solid, liquid and gaseous fossil fuels except natural gas	4	4
	Natural gas	6	6
	Biomass, biogas	6	6
Above 100 (incl.)	Solid, liquid and gaseous fossil fuels except natural gas	2	2
	Natural gas	3	3
	Biomass, biogas	2	2

Table 5. Intervals of regular inspections of boilers and heating systems.

There are 217 licensed bodies and 269 qualified experts registered for the regular inspection of heating systems (2019).

Inspections are ordered and paid for by the owner of the building or by the contractual administrator of the building or system. Building owners (or administrators of buildings or systems) are required to:

- arrange regular inspections of heating systems;
- keep inspection reports until a new one is received at the next periodic inspection;
- submit the last inspection report to the new owner in the case of transfer or reassignment of the ownership of the building;
- provide a copy of the latest inspection report to tenants when renting a building or heating system.

Summary data on performed inspections of heating systems including boilers in the period of 2010 – 2019 according to received inspection reports is presented in Table 6.

Data	Unit	Year									
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of inspected boilers	boiler unit	1,018	363	227	1,201	970	1,015	599	385	467	496
Total heat output of inspected boilers	MW	273.13	52.28	40.09	163.67	166.61	150.78	199.7	182	141.34	143.13
Number of LBs who sent reports	-	18	22	20	33	37	29	30	43	39	37
Share of boilers not fulfilling the required combustion efficiency out of the total number of inspected boilers	%	6.5	6.1	3.1	5.3	6.2	5.3	8.4	7.9	4.7	8.8
Share of boilers older than 15 years out of the total number of inspected boilers	%	23.1	28.7	36.2	19.8	35.6	26.9	31.9	29.8	28.1	37.3
Number of performed expanded heating systems inspections with boiler older than 15 years	Inspection	65	27	47	134	226	172	162	121	87	200

Table 6. Summary data on performed inspections of heating systems including boilers during the 2010 – 2019 period according to received inspection reports.

From the draft amendment of the Act 321/2014, it is expected among others that regular inspections will have to be performed on heating or AC systems with a total installed heating or cooling output higher than 70 kW per building. The following buildings are not subject to regular inspection: buildings that are also not subject to energy certification; non-residential buildings with installed output of heating or AC systems higher than 290 kW if they will have BACS installed; residential buildings equipped with BACS enabling continuous monitoring of the energy efficiency of the heating or AC system and optimisation of the energy use in the building or which are subject to a guaranteed energy service. The obligation of inspection will be extended not only to heating systems with boilers, but also to those systems equipped with hot water heaters, or using electric resistance heating, heat pumps or other energy, e.g., mainly solar energy. It is proposed to change the interval of regular inspections of heating systems as shown in Table 7.

Installation for the production or supply of heat	Interval of regular inspection [year]
Combustion equipment for natural gas	4
Combustion equipment for solid and liquid fuels other than natural gas	3
Electrical resistance device	5
Heat pump	5
Other equipment (e.g. heat exchanger station, solar thermal collector)	5

Table 7. Proposed new intervals for regular inspection of heating systems (Draft amendment of Act 321/2014).

2.IV.vi. Progress and current status on AC systems (Inspection / Equivalence)

The provisions around AC system inspections are similar to those for heating inspections, as included in section 2.IV.v.

Inspections of AC systems are based on the assessment of their efficiency under defined normal working conditions and must follow the reference methodologies, among others, based on EN standards, e.g., EN 16798-17. A detailed national methodology is defined in Decree 422/2012. The regular periods of inspection depend on the cooling output of the inspected AC system (Table 8). Inspections are ordered and paid for by the owner of the building or the contractual administrator of the building or the system. The requirements for building owners (or administrators of buildings or systems) are the same as for heating system inspections. Promotional activities are similar to the activities performed in case of inspections of heating systems.

As of 2019, there are 84 licensed bodies and 117 qualified experts registered for the regular inspection of AC systems.

The first summary report was prepared for inspections undertaken in 2011. For 2019, inspections should be implemented for all AC systems with a cooling output of over 12 kW(Table 8). The main summary data for the period of 2011 – 2019 are given in Table 8.

Nominal cooling output of AC system [kW]	Interval of regular inspection [year]
In the range of 12 (incl.) to 50	8
In the range of 50 (incl.) to 250	6
In the range of 250 (incl.) to 1,000	4
Above 1,000 (incl.)	2

Table 8. Intervals of regular inspections of AC systems.

From the draft amendment of the Act 321/2014 it is expected among others that regular inspections will have to be performed on AC systems with a total installed cooling output higher than 70 kW per building. The following buildings are not subject to regular inspection: buildings that are also not subject to energy certification; non-residential buildings with an installed AC system output higher than 290 kW if they will have BACS installed; residential buildings equipped with BACS enabling continuous monitoring of energy efficiency of the AC system and optimisation of the energy use in the building or are subject of guaranteed energy service. It is proposed to change the interval of the regular inspection of AC systems to 5 years without a differentiation of cooling output. The subject of the inspection should not be ventilation systems as such but only the AC systems or combined (ventilation) systems connected to heating systems. If the system with a heat pump delivers heating and cooling, it should be inspected as a part of an AC system.

2.IV.vii. Enforcement and impact assessment of inspections

Enforcement and penalties

For the purposes of monitoring, once a year, at the latest by 31 January, licensed bodies are required to send an electronic copy of all inspection reports produced in the previous year to the SIEA (on behalf of the Ministry). The owner or administrator of a building or system may be fined if he/she: does not arrange an inspection before the date set (Tables 4 and 7); does not keep the inspection report until receipt of the report from the next periodic inspection; does not submit a report from the last inspection to a new owner; or does not provide a certified copy of the report from the last inspection to a tenant. Owners, however, are not fined for a negative inspection result. The owner (or administrator) is not required to implement the recommendations that the qualified expert includes in the inspection report.

The Slovak Trade Inspection is responsible for compliance checking for both inspection systems. In case it is found during the check that the inspections carried out by certain qualified experts were not undertaken in accordance with the regulations, the ministry is allowed to remove that particular qualified expert from the register. So far, only one expert has been removed from the list of qualified experts in 2013, but this was for reasons other than shortcomings identified by supervisors. If a licensed body fails to send the report from the inspection to the ministry, it can be fined up to 200 €.

Quality control of inspection reports

All inspection reports are registered in the monitoring system administered by the SIEA. The ministry (or the SIEA on behalf of the ministry) checks a statistically significant percentage of inspection reports received every year, and at least one inspection report submitted by each licensed body is inspected. Quality control is similar for both inspection systems and is focused on both formal fulfilment of the legislative requirements and the content, and in particular the calculation procedure and the final results written in the particular report. Key findings are subsequently followed up in the training process. In 2019, nine licensed bodies produced 118 AC system inspection reports, from which nine reports were checked for quality. Regarding the heating system inspections, 37 licensed bodies sent 600 inspection reports, and 37 of those reports were quality checked.

Impact assessment, costs and benefits

The findings of quality checks carried out on inspection reports were incorporated in improvements to the training process and were communicated during the regular professional re-training (42 qualified experts for inspection of heating systems, and 11 qualified experts for inspection of AC systems in 2019). Key findings and recommendations based on the analysis of regular inspection reports were communicated during information activities, meetings and conferences featuring state authorities, public bodies and municipalities and were taken into account in the preparation of the training process for professionals provided by the SIEA.

3. A success story in EPBD implementation

A noteworthy success of the Slovak Republic, in relation to creating the enabling conditions for improving the energy performance of buildings, is the strong interlinkage of different policies and steady improvements over time. The Slovak Republic started to implement the EPBD in 2005. Since that time, the general principles and methods of energy performance certification have remained constant. The system was developed, refined and extended in accordance with the evolution of the requirements in the EPBD as well as European Standards, new knowledge and the development of common conditions for the energy performance of buildings. That is the biggest success. A very important aspect for the successful implementation of the EPBD was the introduction of definitions related to the energy performance of buildings, but also the extension of terms initially provided in the EED.

The implementation process in relation to the EPBD was supported by CEN standards that were translated into the Slovak language. All of these standards were transposed into the Slovak technical standards system.

Defining these concepts also requires determining the conditions for which loans for carrying out major and deep renovations are granted. Upon any request for grants or loans, documentation should indicate that all the requirements of the EPBD can be achieved.

Research work conducted since 1992 included pilot and demonstration projects aimed at reducing energy use and the consumption of energy at the very least. The obtained results were used for the revision of thermal protection standards, but also for setting regulations on the energy use of technical building systems, leading to a decrease in energy demand supplied by RES. In 2012, a path was set for the gradual tightening of requirements concerning the thermal protection of building envelope components and the energy performance of buildings towards the NZEB energy level of construction. The requirements were set based on calculations of cost-optimal minimum requirements for energy performance of buildings. This influenced the innovation and changed market conditions for construction products. Achieved results influence the continuous improvements in the housing stock and the implementation of new conditions for overall policy integration, which has led to energy savings and improvements to the energy performance of buildings. Newly implemented procedures raise the awareness of building owners and mobilise them towards the energy renovation of buildings.

4. Conclusions, future plans

The EPBD was implemented under Act 555/2005 and amended by Ministerial Decree 364/2012 which came into force in January 2013. Since January 2008, EPCs have been issued for new buildings and buildings undergoing major renovations when either sold or rented. The EPC template has also changed and a new one was presented in the 2013 decree. The last change of the EPC template was adopted with Decree 35/2020 amending Decree 364/2012. A methodology for the energy certification of individual apartments or building units came into force in 2017 when a dedicated EPC template was also provided. It is to be noted that the compliance control system has been functional since 2017.

The extensive renovation of the building stock, which focuses on deep renovations and implementing renewable energy sources to achieve the NZEB level, will have great importance. This will require the additional training of experts, especially as regards quality assessment. In addition, it will be necessary to extend information campaigns targeting owners to provide the financial tools for supporting deep renovations and to provide a step-by-step renovation process as well.

The building construction and renovation process will also influence companies in the market which, with the help of trained and skilled workers, must carry out all construction works while ensuring that the required quality and level of construction are met. The scope of the work will require workers who are knowledgeable in progressive building structures and new technologies as well as how to handle technical building systems, including automation and control systems.

The main challenge is to engage all involved groups (designers, developers, providers, owners and tenants) in the effort to change their attitude towards the construction of NZEB, which will require a new architectural perspective concerning the use of new materials and technical building systems, including heat recovery systems and smart metering, as well as the integration of RES.

Endnotes

1. STN 73 0540-2+Z1+Z2:2019 Tepelná ochrana budov. Tepelnotechnické vlastnosti stavebných konštrukcií a budov. Časť 2: Funkčné požiadavky

2. Vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovenskej republiky č. 364/2012 Z. z. z 12. novembra 2012, ktorou sa vykonáva zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *slov-lex.sk/pravne-predpisy/SK/ZZ/2012/364/*

3. Vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovesnkej republiky č. 324/2016 Z. z. z 30. novembra 2016, ktorou sa mení a dopĺňa vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovenskej republiky č. 364/2012 Z. z., ktorou sa vykonáva zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *slov-lex.sk/pravne-predpisy/SK/ZZ/2016/324/20170101.html*

4. Vyhláška Ministerstva dopravy a výstavby Slovenskej republiky č. 35/2020 Z. z. z 11. februára 2020, ktorou sa mení a dopĺňa vyhláška Ministerstva dopravy, výstavby a regionálneho rozvoja Slovenskej republiky č. 364/2012 Z. z., ktorou sa vykonáva zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov ; https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2020/35/vyhlasene_znenie.html

5. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 308/2016 Z. z. z 24. októbra 2016, ktorou sa ustanovuje postup pri výpočte faktora primárnej energie systému centralizovaného zásobovania teplom; *slov-lex.sk/static/pdf/2016/308/ZZ_2016_308_20170101.pdf*

6. Zákon č. 50/1976 z 27. apríla 1976 o územnom plánovaní a stavebnom poriadku (stavebný zákon) v znení neskorších predisov (najmä zákona č. 237/2000 Z.z. https://zakony.judikaty.info/predpis/zakon-50/1976

7. Zákon č. 555/2005 Z. z. z 8. Novembra 2005 o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení zákona č. 300/2012 Z. z. z 18. septembra 2012, ktorým sa mení a dopĺňa zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov a ktorým sa mení a dopĺňa zákon č. 50/1976 Zb. o územnom plánovaní a stavebnom poriadku (stavebný zákon); www.slov-lex.sk/static/pdf/2005/555/ZZ_2005_555_20170615.pdf; www.slov-lex.sk/static/pdf/2012/300/ZZ_2012_300_20130701.pdf; https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2019/378/vyhlasene_znenie.html

8. Zákon č. 321/2014 Z. z. z 21. októbra 2014 o energetickej efektívnosti a o zmene a doplnení niektorých zákonov; www.urso.gov.sk/sites/default/files/z_321_2014.pdf

9. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 422/2012 Z. z. z 13. decembra 2012, ktorou sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému ktorou sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému sa ustanovuje postup pri pravidelnej kontrole vykurovacieho systému, rozšírenej kontrole vykurovacieho systému a pri pravidelnej kontrole klimatizačného systému; *slov-lex.sk/pravne-predpisy/SK/ZZ/2012/422/20130101*

10. Vyhláška Úradu pre reguláciu sieťových odvetví č. 328/2005 Z. z. z 13. júla 2005, ktorou sa určuje spôsob overovania hospodárnosti prevádzky sústavy tepelných zariadení, ukazovatele energetickej účinnosti zariadení na výrobu tepla a distribúciu tepla, normatívne ukazovatele spotreby tepla, rozsah ekonomicky oprávnených nákladov na overenie hospodárnosti prevádzky sústavy tepelných zariadení a spôsob úhrady týchto nákladov; *slov-lex.sk/pravne-predpisy/SK/ZZ/2005/328/20080301*

11. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 282/2012 Z. z. z 18. júla 2012, ktorou sa ustanovujú technické požiadavky na tepelnú izoláciu rozvodov tepla a teplej vody; *slov-lex.sk/pravne-predpisy/SK/ZZ/2012/282/vyhlasene_znenie.html* (

12. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 358/2013 Z. z. z 28. októbra 2013, ktorou sa ustanovuje postup a podmienky v oblasti zavádzania a prevádzky inteligentných meracích systémov v elektroenergetike *slov-lex.sk/pravne-predpisy/SK/ZZ/2013/358/20131115*

13. Vyhláška Ministerstva hospodárstva Slovenskej republiky č. 168/2015, zo 6. júla 2015, ktorou sa mení vyhláška Ministerstva hospodárstva Slovenskej republiky č. 358/2013 Z. z., ktorou sa ustanovuje postup a podmienky v oblasti zavádzania a prevádzky inteligentných meracích systémov v elektroenergetike; *slov-lex.sk/pravne-predpisy/SK/ZZ/2015/168/vyhlasene_znenie.html*

14. Zákon č. 150/2013 Z. z. z 15. mája 2013 o Štátnom fonde rozvoja bývania v znení neskorších predpisov; *slov-lex.sk/pravne-predpisy/SK/ZZ/2013/150/*

15. Zákon č. 277/2015 Z. z. Zákon, ktorým sa mení a dopĺňa zákon č. 443/2010 Z. z. o dotáciách na rozvoj bývania a o sociálnom bývaní v znení zákona č. 134/2013 Z. z. a ktorým sa mení a dopĺňa zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; *zakonypreludi.sk/zz/2015-277*

16. *http://zelenadomacnostiam.sk/sk*

17. Integrovaný regionálny operačný program 2014-2020; *mpsr.sk/download.php?fID=8962*

18. OP Kvalita životného prostredia, Prioritná os 4.3;
https://www.opkzp.sk/dokumenty/dokumenty/programove-dokumenty/
https://www.opkzp.sk/dokumenty/dokumenty/programove-dokumenty/

19. https://www.siea.sk/bezplatne-poradenstvo/o-projekte-poradenstva/projekt-zit-energiou/
https://www.siea.sk/bezplatne-poradenstvo/o-projekte-poradenstva/projekt-zit-energiou/

20. https://www.ta3.com/publicistika/313/s-energiou-efektivne.html

21. https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_sk_slovakia.pdf

Annexes - Key Indicators & Decisions

Key Indicators & Decisions – General Background

no	Key Implementation Decisions – General Background	Description / value / response	Comments
01.01	Definition of public buildings (according to article 9 b)	Public building is a building owned or administered by a public entity.	The definition is set in Act 321/2014 on Energy Efficiency, section 2, k.
01.02	Definition of public buildings used by the public (according to article 13)	Buildings often visited by the public	Under the Act 555/2005 as amended by Act 300/2012
01.03	Number of residential buildings	Total number of residential buildings 1,129,898* Apartment buildings 66,293** Single-family houses 1,063,605***	*Census 2011, official statistics for the period until 2019 **The period 2011-2019 ***Database of TSUS + estimate, official statistics until 2019
01.04	Number of non-residential buildings	28,073	Database of TSUS (until 2011), official statistics for the period of 2011-2019 + estimate
01.05	If possible, share of public buildings included in the number given in 01.04	15,532	Database of TSUS + estimate (official statistics only for 2017-2019)
01.06	If possible, share of commercial buildings included in the number given in 01.04	5,556	Estimate (official statistics only for 2017-2019)
01.07	Number of buildings constructed per year (estimate)	12,855	Official statistics and estimate
01.08	If possible, share of residential buildings constructed per year (estimate, included in the number given in 01.07)	12,520	Estimate based on statistic data
01.09	If possible, share of non-residential buildings constructed per year (estimate, included in the number given in 01.07)	332	Estimated and official statistics
01.10	Useful floor area of buildings constructed per year in million square meters (estimate)	2,000,000	Average from statistics + estimate

Key Indicators & Decisions – New Buildings

no	Key Implementation Decision – New Buildings	Description / value / response	Comments
02.01	Are building codes set as overall value, primary energy, environment (CO_2), reference building or other	The basic document within the Building Code is the Building Act 50/1976 as amended, especially Act 237/2000. Overall conditions and principles are set in the Act 555/2005 on energy performance of buildings and Ministerial Decree 364/2012 as amended. The primary energy factors are set in Decree 324/2016.	Building Act 50/1976 as amended is in the process of revision, respectively drafting of a new law by the end of 2021. The last amendment to the EPB Act and the accompanying Ministerial Decree applies as of 10 March 2020.
02.02	Requirements for energy performance of residential buildings in current building code	Since 1 January 2016, standardised requirements on ultra-low level of construction have been set; requirements meet the cost-optimal levels of minimum requirements on EPB. Since 1 January 2021, standardised requirements on NZEB construction level have been set.	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 1.0); heat recovery min. 60%; global indicator kWh/(m^2.year) class A1: apartment buildings less than 63, family houses less than 108. U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 0.85); heat recovery min. 60%; use of RES; global indicator kWh/(m^2.year) class A0. If the NZEB exports or stores energy, it is classified in subclass $A0^+$. EPB calculations are according to STN EN ISO standards, climatic and indoor conditions according to national STN standards.
02.03	Requirements for energy performance of non-residential commercial buildings in current building code	Since 1 January 2016, standardised requirements on ultra-low level of construction have been set; requirements meet the cost-optimal levels of minimum requirements on EPB. Since 1 January 2021, standardised requirements on NZEB construction level have been set.	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 1.0); heat recovery min. 60%; global indicator – primary energy in kWh/(m^2.year) class A1: e.g. office buildings less than 122, schools less than 68. U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 0.85); heat recovery min. 60%; use of RES; global indicator kWh/(m^2.year) class A0: e.g. office buildings less than 61, schools less than 34. If the NZEB exports or stores energy, it is classified in subclass $A0^+$. EPB calculations are according to STN EN standards, climatic and indoor conditions according to national STN standards.
02.04	Requirements for energy performance of non-residential public buildings in current building code	Since 1 January 2016, standardised requirements on ultra-low level of construction have been set; requirements meet the cost-optimal levels of minimum requirements on EPB. Since 1 January 2019, standardised requirements on NZEB construction level have been set.	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 1.0); heat recovery min. 60%; global indicator – primary energy in kWh/(m^2.year) class A1: e.g. office buildings less than 122, schools less than 68. U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 0.85); heat recovery min. 60%; use of RES; global indicator kWh/(m^2.year) class A0: e.g. office buildings less than 61, schools less

no	Key Implementation Decision – New Buildings	Description / value / response	Comments
			than 34. If the NZEB exports or stores energy, it is classified in subclass A0. EPB calculations are according to STN EN standards, climatic and indoor conditions according to national STN standards.
02.05	Is the performance level of nearly zero energy (NZEB) for new buildings defined in national legislation?	Yes	In Act 555/2005 as amended by Act 300/2012 art. 2, section 8 Definition: Nearly zero-energy building means a building has a very high energy performance. The nearly zero or very low level of energy should be accomplished through effective thermal protection and energy from renewable sources, including energy from renewable sources produced on-site or nearby.
02.06	Nearly zero energy (NZEB) level for residential buildings (level for building code)	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 0.85); heat recovery min. 60%; use of RES; global indicator kWh/(m^2.year) class A0: apartment buildings less than 32, family houses less than 54. If the NZEB exports or stores energy, it is classified in subclass $A0^+$.	Calculations are according to STN EN ISO standards, climatic and indoor conditions according to national STN standards.
02.07	Year / date for nearly zero energy (NZEB) as level for residential buildings (as indicated in 02.04)	2021	For all new buildings and for renovated buildings when functionally, technically or economically feasible
02.08	Nearly zero energy (NZEB) level for all non-residential buildings (level for building code)	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 0.85); heat recovery min. 60%; use of RES; global indicator kWh/(m^2.year) class A0: e.g. office buildings less than 61, schools less than 34. If the NZEB exports or stores energy, it is classified in subclass $A0^+$.	EPB calculations are according to STN EN ISO standards, climatic and indoor conditions according to national STN standards
02.09	Year / date for nearly zero energy (NZEB) as level for non-residential buildings (as indicated in 02.06)	2019 – public buildings 2021 – all new buildings and renovated existing buildings when functionally, technically and economically feasible	For all new buildings and for renovated buildings when functionally, technically or economically feasible
02.10	Are nearly zero energy buildings (NZEB) defined using a carbon or environment indicator?	Partly	Global indicator is set for primary energy. Emission coefficients are set for different energy carriers in the Ministerial Decree 324/2016. Result of CO_2 emissions calculation is included in the EPC. Requirements on level of CO_2 emissions are not set.
02.11	Is renewable energy a part of the overall or	Energy required for using NZEB should be covered to	Ratio of RES used is showed in every EPC.

no	Key Implementation Decision – New Buildings	Description / value / response	Comments
	an additional requirement?	a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. There is no minimum requirement on the level of RES.	
02.12	If renewable energy is an additional requirement to NZEB, please indicate level	Ratio of renewable energy is not required.	Ratio of RES use is showed in every EPC.
02.13	Specific comfort criteria for new buildings, provide specific parameters for instance for airtightness, minimum ventilation rates	Yes	Criteria for internal air; min air change 0.5/h; airtightness 0.6

Key Indicators & Decisions – Existing Buildings

no	Key Implementation Decision – Existing Buildings	Description / value / response	Comment
03.01	Is the level of nearly zero energy (NZEB) for existing buildings set in national legislation?	Yes	In the Act 555/2005 as amended by Act 300/2012 art. 2, section 8
03.02	Is the level of nearly zero energy (NZEB) for existing buildings similar to the level for new buildings?	Yes, they are similar to the levels of the new buildings.	Existing buildings should fulfil the requirements on new buildings if technically, functionally and economically feasible
03.03	Definition of nearly zero energy (NZEB) for existing residential buildings (if different from new buildings)	Definition is the same as for new buildings.	Definition: Nearly zero-energy building means a building has a very high energy performance. The nearly zero or very low amount of energy required to use such a building should be provided with effective thermal protection and covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.
03.04	Definition of nearly zero energy (NZEB) for existing non-residential buildings (if different from new buildings)	Definition is the same as for new buildings.	Is the same as for new buildings
03.05	Overall minimum requirements in case of major-renovation	Definition of major renovation (according to Act 555/2005 as amended by 300/2012): Bbuilding construction modifications to an existing building which affect more than 25% of its surface area, in particular by thermal insulation of the peripheral and roof structures and replacement of the openings.	U-values in W/(m^2.K) (e.g. external walls 0.22, roof 0.15, windows 1.0); heat recovery min. 60%; global indicator kWh/(m^2.year) A1: apartment buildings less than 63, family houses less than 108.
03.06	Minimum requirements for individual building parts in case of renovation	Duty to fulfil the requirements on U-value (after national standard STN 73 0540-2:2012, STN 73 0540-2/Z1:2016) since 1 August 2016 has been set for ultra-low energy buildings (U_{r1}); STN 73 0540-2+Z1+Z2:2019 since 1 July 2019 has been set for NZEB (U_{r2}); in the case where it is functionally, technically and economically not feasible implementing the proposed measure, the building part subject to renovation must satisfy the requirement to fulfil certain hygienic criteria (in such a case the U-value should be lower than U_{max} (Table 1).	The Slovak Republic is characterised by one climatic zone. External wall U_{max}: 0.46; U_{r1}: 0.22 Roof U_{max}: 0.30; U_{r1}: 0.15 Windows U_{max}: 1.70; U_{r1}: 1.00

no	Key Implementation Decision – Existing Buildings	Description / value / response	Comment
03.07	National targets for renovation in connection to Long Term Renovation Strategy (number or percentage of buildings)	National targets are currently subject to approval by the government.	
03.08	National targets for renovation in connection to Long Term Renovation Strategy (expected reductions and relevant years)	National targets for expected reductions and milestones are currently subject to approval by the government.	

Key Indicators & Decisions - Energy Performance Certificates

no	Key Implementation Decision – Energy Performance Certificates	Description / value / response	Comment
04.01	Number of energy performance certificates per year (for instance average or values for of 3-5 years)	17.801 (2019) 17.132 (2018) 15.896 (2017) For 2014-6: 35,142 family houses, 4,671 apartment buildings, 1,415 office buildings, 512 schools	
04.02	Number of EPCs since start of scheme	132,577 (10/2009 – 12/2019)	Issuing of EPCs started in 1 January 2008, but the obligation to register them started in 1 October 2009 due the revision of the Ministerial Decree. The number of issued EPCs during this period is missing from the total sum.
04.03	Number of EPCs for different building types		
04.04	Number of assessors	385	List of assessors is kept at the Slovak Chamber of Civil Engineers (SKSI) separately for four different types of assessors working on EPCs (thermal protection, heating and hot water, ventilation and AC, lighting). Registration is mandatory.
04.05	Basic education requirements for assessors	Master's Degree	Civil engineer, architect, machinery or electrotechnical, following the requirements stated in act 555/2005 section 6, clause 3
04.06	Additional training demands for assessors	Not mandatory	Various events are organised by the Slovak Chamber of Civil Engineers, mainly focused on new regulations and procedures.
04.07	Quality assurance system	Trade inspection carried out 148 inspections in 2016.	According to Act 555/2005, the Slovak Trade Inspection since 2014 has been responsible for the quality assurance (QA) of EPCs. The Slovak Trade Inspection is also responsible for checking if EPCs are displayed in public buildings. The processing of EPCs is done on-line. The system checks that input data fulfils certain conditions before it is allowed to finalise and print the EPC. The number of refused EPCs is not registered.
04.08	National database for EPCs	Yes	Central register
04.09	Link to national information on EPCs / Database	https://www.inforeg.sk/ec/	

Key Indicators & Decisions – Smart Buildings and Building Systems

no	Key Implementation Decision – Smart Buildings and Building Systems	Description / value / response	Comment
05.01	Is there a national definition of smart buildings?	No	
05.02	Are there current support systems for smart buildings?	No	
05.03	Are there currently specific requirements for technical building systems (for instance in building codes)?	No	
05.04	Are there current requirements for automatics (for instance in building codes)?	No	
05.05	Chosen option A or B for heating systems (inspection or other measures)	A (regular inspection scheme)	
05.06	Number of heating inspections; reports per year (if option A)	See Table 5 in 'Implementation of the EPBD in the Slovak Republic '	The values related to inspection reports are based on yearly reports from the SIEA (operator of the monitoring system for energy efficiency) to the Ministry of Economy. These reports are subject of mandatory registration.
05.07	Chosen option A or B for cooling systems (inspection or other measures)		
05.08	Number of AC/cooling system inspections; reports per year (if option A)	A (regular inspection scheme) See Table 8 in 'Implementation of the EPBD in the Slovak Republic	The values related to inspection reports are based on yearly reports from the SIEA (operator of the monitoring system for energy efficiency) to the Ministry of Economy. Reports from LBs are subject of mandatory registration.
05.09	Is there a national database for heating inspections?	Yes	According to Act 314/2012 on regular inspections of heating and AC systems, every LB performing an inspection is obliged to send reports from inspections performed in the past year to the operator of the monitoring system for energy efficiency. Reports stored in the database as electronic files (.pdf or .doc or .xls) are verified, analysed and processed in order to prepare the yearly report to the Ministry of Economy.
05.10	Is there a national database for cooling/AC inspections?	Yes	According to Act 314/2012 on regular inspections of heating and AC systems, every LB performing inspections is obliged to send reports from inspections performed in the past year to the operator of the monitoring system for energy efficiency. Reports stored in the database as electronic files (.pdf or .doc or .xls) are verified, analysed and processed in order to prepare the yearly report to the Ministry of Economy.

no	Key Implementation Decision – Smart Buildings and Building Systems	Description / value / response	Comment
05.11	Are inspection databases combined with EPC databases for registration of EPCs and inspection reports?	No	
05.12	Link to national information on Inspection / Database		

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