CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

EPBD implementation in **Lithuania**

Status in December 2016

AUTHORS

Robertas Encius -*Certification Centre of Building Products (SPSC)*; Tomas Baranauskas *Construction Standardisation Division the Ministry of Environment of the Republic of Lithuania*

NATIONAL WEBSITES

www.am.lt, www.enmin.lt, www.spsc.lt, www.betalt.lt, www.ena.lt, www.vei.lt

1. Introduction

The Ministry of Environment and the Ministry of Energy are jointly responsible for the transposition and implementation of the EPBD in Lithuania.

Directive 2010/31/EU and the national calculation of cost-optimal levels of minimum energy performance requirements have been transposed into Lithuanian laws as planned, so that Lithuania is on track towards implementing relevant requirements. The main requirements were set up through the Law on Construction and the Law on Energy, and were further detailed in technical regulations, distributing energy efficiency requirements throughout all steps of planning, designing and constructing buildings.

2. Current Status of Implementation of the EPBD

2.I. Energy performance requirements: NEW BUILDINGS

2.I.i. Progress and current status of new buildings

Certification, as a mandatory requirement for new buildings, came into force on 1 January 2007. New buildings, including building units, must be certified after the construction is completed. The energy performance class of new buildings and building units must not be lower than A when the permit for the construction works is undertaken after 1 November 2016. The permit for construction will therefore not be issued if the energy efficiency class of the designed building is not in line with mandatory requirements.

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

The main provisions for the energy performance and the certification of the energy performance of buildings are described in the Law on Construction and the Law on Energy for the Republic of Lithuania. The calculation procedure is defined in the Building Technical Regulation STR 2.01.02:2016 "*Design and Certification of Energy Performance of Buildings*", adopted on 11 November 2016 by Order No. D1-754 of the Minister of Environment[1]. Additional rating definitions of low energy buildings, which are applicable to buildings of energy efficiency classes B, A and A+, and NZEB of class A++, are introduced in the updated regulation that came into force on 1 January 2017.

The current calculation scheme is slightly different for new buildings and existing buildings before and after major renovations.

The building energy performance class is determined in accordance with the values of the building parameters, including:

- the calculated specific heat loss of the building envelope;
- building tightness;
- mechanical ventilation with heat recovery system technical indicators;
- energy consumption for heating buildings;
- building partitions between the floors and the spans of thermal properties;
- the building energy performance indicator C1 value, describing the non-renewable primary energy efficiency of heating, ventilation, cooling and lighting;
- the building energy performance indicator C2 value, describing the primary non-renewable energy efficiency domestic hot water preparation; and
- the building energy consumption of RES.

The Building Technical Regulation STR 2.01.02:2016 includes the requirements for cost-optimal levels of minimum energy performance requirements for all categories of buildings, both new and existing.

The requirements for new single-family, multi-family, office and educational buildings on a cost-optimal level are based on the "financial" calculation with a 3% real discount rate (1,080 cases of calculations, which were calculated to set the cost-optimal levels).

According to the results of the calculation, the difference between the cost-optimal level of new buildings and normative requirements of the Regulation No. 244/2012, delegated by the European Commission, range approximately between -34% until 2016 (Class B) and -10 % after 2016 (class A).

Requirements set as U-values in W/(m^2.K) for residential buildings

Building element	**Normative U-value, W/(m^2.K)**			
	Class B	***Class A***	***Class A+***	**Class A++**
Roofs	0.16	0.10·κ	0.10·κ	0.080·κ
Ceiling in contact with outdoor air				
Building elements in contact with ground	0.25	0.14·κ	0.14·κ	0.10·κ
Ceilings over unheated basements and crawls				
External walls	0.20	0.12·κ	0.13·κ	0.10·κ
Windows and transparent building elements	1.6 [1)]	1.0·κ	1.0·κ	0.70·κ
Doors and gates	1.6	1.4·κ	1.0·κ	0.70·κ
1) If the total area of windows and other transparent building elements exceeds 25% of the total external wall area, the U-value of transparent elements shall not exceed 1.3 W/(m^2.K).				
2) k = 20/(θ_i – θ_e),– temperature correction factor, where θ_i = indoor air temperature in Celsius, θ_e = outdoor air temperature or design temperature of adjacent space in Celsius. Temperature of unheated spaces is determined separately. If indoor air temperature θ_i = 20^{o}C and outdoor air θ_e = 0^{o}C, then k = 1.				

Table 1. Normative requirements for the thermal protection of residential building envelopes.

The following factors shall conform to the requirements for the design of buildings and the certification of the EPBD:

	For class C buildings:	For class B low energy buildings:	For class A, A+ and A++ buildings:
1.	a) heat transfer coefficient, W/K,	a) heat transfer coefficient, W/K;	a) heat transfer coefficient, W/K;
2.	b) energy performance indicator "C_1" value	b) energy performance indicators "C_1" and "C_2" values	b) energy performance indicators "C_1" and "C_2" values
3.	___	c) calculated annual energy consumption for heating, kWh/m^2 per year;	c) calculated annual energy consumption for heating, kWh/m^2 per year;
4.	___	d) calculated airtightness of building	d) airtightness test of building
5.	___	___	f) efficiency of heat recovery equipment in ventilation system of a building;
6.	___	___	e) part of the RES (for class A++)

Table 2. Requirements for energy performance classes of buildings.

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

The national NZEB plan describes the main steps towards increasing the number of NZEB in Lithuania. The new calculation methodology according to EPBD requirements was prepared and has been valid since February 2017. The calculation software tool was also corrected to reflect the changes in the calculation methods[2]. The default selection data in the software, in the form of selection tables, are expanded.

Additional rating definitions of low energy buildings, which are applicable to buildings of energy efficiency classes B, A and A+, and NZEB (class A++), are introduced in the Building Technical Regulation STR 2.01.02:2016.

The minimum energy performance class of new buildings and building units are being progressively tightened towards NZEB based on the energy efficiency classes:

- from 2016 - the energy performance class must be at least A;
- from 2018 - the energy performance class must be at least A+;
- from 2021 - the energy performance class must be at least A++.

The default heat transmission coefficient values of each element of the building envelope of a designed building are set by:

- normative values taken from the requirements of National Building Technical Regulation STR 2.05.01:2013 "*Thermal Technique of the Buildings' Envelopes*" for classes B and C;
- normative values taken from the supplementary Tables for classes A, A+ and A++;
- reference values corrected according to the changes in construction during the considered period;
- calculated values determined by the same mode, as in the previous edition.

Cost-optimal levels were calculated for new and existing single-family houses or two-apartment houses, multi-story residential buildings, and educational and administrative buildings, according to the

requirements of the Commission Delegated Regulation (EU) No 244/2012 and Guidelines 2012**/**C 115/01**.** Determining cost-optimal levels for NZEB was not the main purpose of these calculations, but their findings show that, in Lithuania, the same characteristics that are determined for NZEB could be reached by using biofuel energy for heating and hot water preparation in buildings. However, not every player in the construction market could use biofuel boilers, as the central heating system network has been installed and is still in use in many Lithuanian towns.

In order to determine the cost-optimal levels suitable for all Lithuanian construction market players, an evaluation was undertaken to understand the facilities/selections/variants that could be used in every place in Lithuania.

According to the results of the evaluation, the cost of developing NZEB is much higher than the cost-optimal levels, taking into account the costs of construction, energy and economic indicators from 2012.

The definition of NZEB is stated in Building Technical Regulation STR 2.01.02:2016 as "***buildings that use almost no energy,*** *which meet the requirements of the A++ energy efficiency class, are very high energy performance buildings in which energy consumption is almost zero or very low, and most of the energy consumption is covered by RES, including that which is produced on-site or nearby*".

Starting 1 January 2021, all new buildings with construction permits shall fulfil NZEB requirements.

All new public buildings with construction permits undertaken shall fulfil NZEB requirements starting 1 January 2019.

By the end of 2016, approximately 158,500 EPCs had been issued and registered in Lithuania. A total of 2 EPCs were issued for buildings achieving energy performance class A++, 56 EPCs for buildings of energy performance class A+ and 123 EPCs for buildings of energy performance class A.

2.I.iv. Requirements for systems and / or building components for new buildings

The requirements for the design of thermal technical features of the building structures are mandatory and established in the Building Technical Regulation STR 2.01.02:2016 for designing new buildings, as well refurbishing (modernising) or repairing existing buildings (in part).

2.II. Energy performance requirements: EXISTING BUILDINGS

2.II.i. Progress and current status of existing buildings

When buildings or building units are offered for sale or for rent, the energy performance indicator of the EPC of the building or the building unit should be stated in the advertisements listed in commercial media. This requirement came into force on 9 January 2013.

The requirements for the energy performance class are not obligatory for existing buildings or building units during sale or rent, but the evaluation procedure and

There are minimum requirements for the design of thermal technical features of building structures. Requirements are mandatory for designing building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope when they are replaced or retrofitted.

Legal requirements for the energy performance for existing buildings after major renovations have been established in Regulation STR 2.01.02:2016. These requirements were implemented on 1 January 2014.

Buildings which have undergone major renovations, in which the cost of the building renovation works amount to more than 25% of the building value, must conform to the following energy performance requirements:

1. The energy performance class of the building or building unit after major renovation must not be less than D if the permit for construction works was undertaken before 1 January 2014.
2. The energy performance class of the building or building unit after major renovation must not be less than C if the permit for construction works was undertaken after 1 January 2014.

The requirements for existing single-family, multi-family, office and educational buildings after major renovations at cost-optimal level are based on the "financial" calculation with a 3% real discount rate (720 cases of calculations which were calculated to set the cost-optimal levels).

According to the results of the calculation, after 1 January 2014, the difference between cost-optimal levels of existing buildings and normative requirements varies approximately between -4.8% and -13%. A one-year transitional period was foreseen to achieve allowable limits.

2.II.ii. Plans to improve the existing building stock

There is no definition of NZEB for existing buildings in Lithuania.

Deep renovations are encouraged by the EED through the requirement to establish long-term strategies for the renovation of the national building stock, covering all building types, including residential and non-residential buildings, whether in private or public ownership.

As per the implementation of Article 4 of the EED, the long-term plan for the renovation of the national building stock was adopted on 10 March 2015 as a part of the National Energy Efficiency Action Plan. The long-term plan covers all five obligations of the Directive:

- an overview of the national building stock;
- cost-effective approaches to renovations;
- policies and measures stimulating deep renovations;
- a forward-looking perspective to guide decisions for individuals and the construction industry; and
- expected energy savings and other benefits.

The targets of the long-term plan for 2020 are to renovate:

- 3,500-4,000 multi-family apartment buildings (9-11% of the multi-family apartment building stock);
- 700,000 m^2 of the building stock owned by the central government (5-6% of the central government's building stock).

Calculations show that by implementing these measures, 785-885 GWh of heating energy will be saved (in calculating from the base year of 2013) and 199-225 thousand tonnes of CO_2-equivalent will be saved.

The targets of the long-term plan for 2030 are to renovate:

- more than 4,000 multi-family apartment buildings (10-11% of the multi-family apartment building stock);
- not less than 800,000 m^2 of the building stock owned by the central government (6-7% of the central government building stock).

It is calculated that after implementing these measures, 228 thousand tonnes of CO_2 equivalent will be saved.

Regarding the implementation of Article 5 of the EED, the programme for improving the energy efficiency of public buildings was adopted on 26 November 2014 by the Government of the Republic of Lithuania. The target of the programme is to improve energy efficiency in public buildings, which are used for administrative, cultural, educational, sports, medical and other purposes.

In summary, the situation regarding existing public buildings is as follows:

- 13,123 public buildings owned by the government and municipalities[3] were registered by 1 January 2014.
- The total area of these buildings is 14.8 million m^2, which is around 35% of all buildings owned by the government and municipalities.
- Around 5,500 buildings (5.9 million m^2) are owned by the government and 7,600 (8.9 million m^2) by municipalities.
- The majority of these buildings were built during 1900-1990. These buildings do not comply with the present energy efficiency requirements, and around 2,300 GWH is used for heating these buildings.

Two major 2020 subtargets are established in the programme:

1. the renovation subtarget for public buildings owned by the government is 470,000 m^2 (responsibility of the Ministry of Energy) and
2. the renovation subtarget for public buildings owned by municipalities is 230,000 m^2 (responsibility of the Ministry of Environment).

The primary annual energy savings from these measures is calculated as 60 GWh; the equivalent of 14,000 tonnes of CO_2 will be saved by 2020. Only buildings that have an EPC energy performance class of less than C can participate in this programme.

2.II.iii. Regulation of system performance, distinct from whole building performance

The Building Technical Regulation STR 2.09.02:2005 “Heating, Cooling and Air-Conditioning” is to be taken into account when designing and building the heating, hot water, AC and ventilation systems in buildings. All minimum requirements set for heating, cooling, hot water and ventilation systems are described in this regulation in line with the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011, and are mandatory for new, replaced and upgraded technical building systems.

Requirements are laid out in the basic principle that technical building systems must be designed in accordance with the intended use of the building.

Systems must use a minimum amount of energy without compromising the indoor air quality of the building.

Building system characteristics must be calculated individually according to the energy performance requirements for the whole building or building unit.

If there are special requirements for the microclimate and the air quality in buildings, the parameters for system design are taken from the hygienic, technological and normative documents of the national legislation. When designing heating, ventilation and AC systems, the requirements for all aspects of the building should be considered in calculations, such as building location, thermal, airtightness, architectural and constructional characteristics, materials for structure and interior design, heat emissions, moisture and pollution from people, equipment, etc., climate conditions and indoor air quality, specific building purpose requirements and other factors.

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

The Lithuanian Housing Strategy was approved on 21 January 2004 by the Lithuanian government. One of the goals of this document is to ensure efficient use, maintenance and major renovation of the existing housing stock. The Programme for the Modernisation of Multi-family Apartment Houses, approved by Resolution No 1213 of the Government of the Republic of Lithuania on 23 September 2004, aims to provide support to home-owners of multi-family buildings when implementing energy efficiency measures; this began at the end of 2005. It is now being revised, envisaging additional financial and other measures aimed at encouraging apartment owners to renovate multi-family apartment houses, which also involves the low-income population in implementing such projects.

In 2010, a financing mechanism (JESSICA) was developed, by which state support will comprise about 30% of the rehabilitation project value from 2011 onwards: starting in 2013, the Lithuanian government decided to speed up the renovation process.

The Lithuanian government negotiated the establishment of the JESSICA Holding Fund[4] to offer an attractive financing scheme to speed up major renovations. Originally the fund size was projected at 227 million € (127 million € from ERDF[5], as well as 100 million € of the Lithuanian national budget).

In 2013, the additional incentive funded from the Special Climate Change Programme complemented the JESSICA programme in the form of an additional investment cost grants (see also best practice example).

2.II.v. Information campaigns / complementary policies

Information campaigns are generally working coherently with financial incentives when directed towards the building owner, motivating the owner to use the incentives. There have also been information campaigns towards the supplier side of the market, informing owners about new building codes, upcoming bans on fossil fuel heating and the importance of advising home-owners on energy upgrades when renovating.

The Public Company Housing Energy Efficiency Agency (BETA)[6] gives special attention to publicity while developing a multi–family apartment building renovation (modernisaton) programme, and has been supporting the subsidy programmes, including the JESSICA funding. The main goal of the publicity campaign is to encourage apartment owners to join the programme, increase public awareness of the programme, ensure that information will be effectively provided to all target groups seeking to take advantage of the programme's support, and develop positive public opinion about the programme.

2.III. Energy performance certificate requirements

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

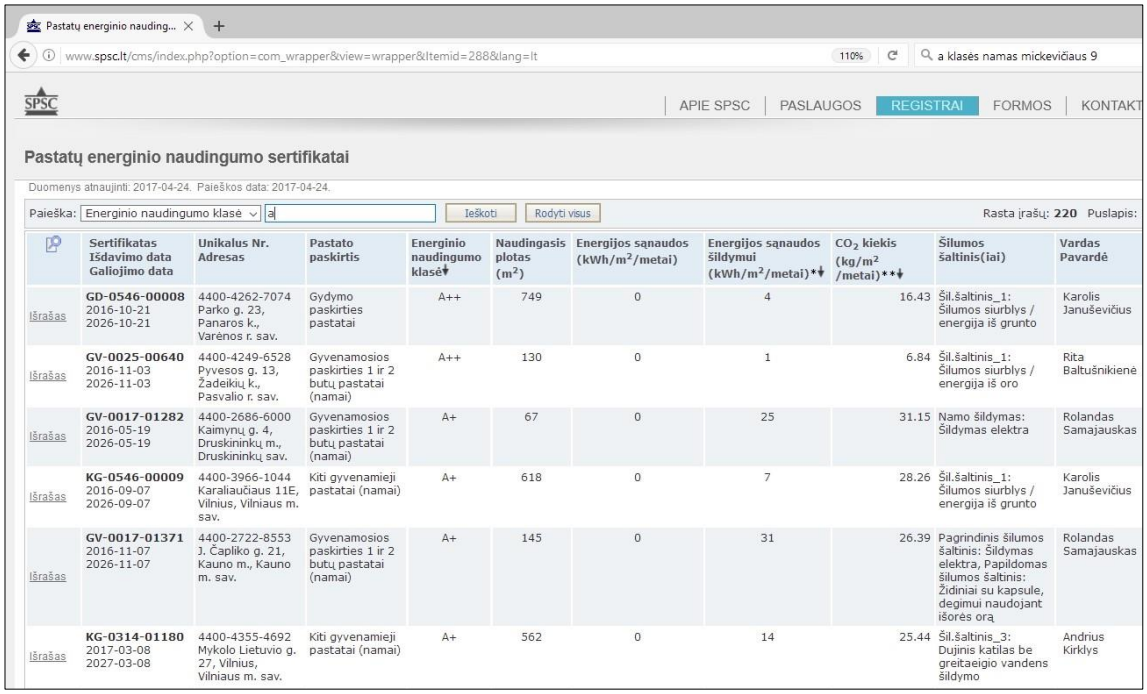
There is an obligation in Lithuania for all new buildings and building units, according to the Building Technical Regulation, to have a certificate of energy performance after construction is finished or when the buildings and building units are offered for sale or for rent. By the end of 2016, more than 158,500 EPCs had been issued since the system was implemented in January 2007.

In Lithuania, all EPCs are collected in the national central database and register. The database is always updated according to the requirements of the Building Technical Regulation. Every qualified expert has an obligation to send every EPC to the central database. Only registered and published EPCs are valid and can be presented to the customer.

Collection and registration of EPCs in the central database allows for quality control, statistical analysis and monitoring of processes.

More than 93% of registered certificates have been issued since January 2013 after new requirements for certification of energy performance of buildings came into force. Approximately 100-200 certificates are issued daily and 2,500-3,000 certificates monthly.

The database of EPCs can be used only by responsible specialists. The central register is published on www.spsc.lt and can be used by related institutions, specialists and private persons (Figure 1)**.** Since July 2014, all data are also transferred to the Real Property Register and Cadastre of Lithuania.

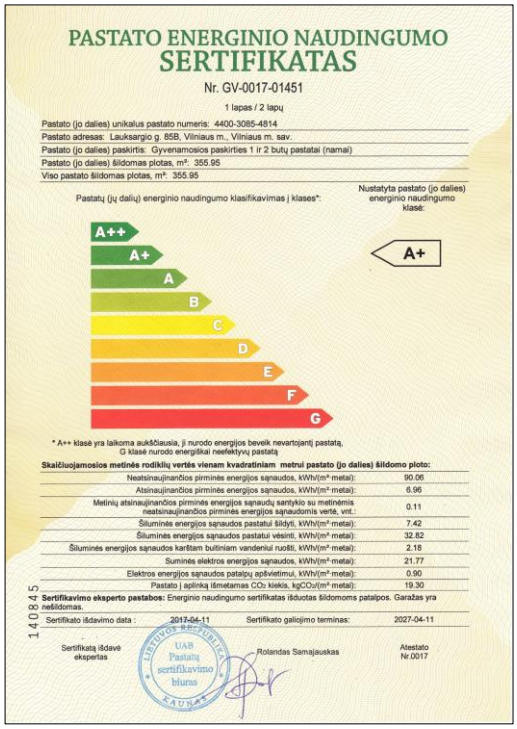


	Sertifikatas Išdavimo data Galiojimo data	Unikalus Nr. Adresas	Pastato paskirtis	Energinio naudingumo klasė	Naudingasis plotas (m^2)	Energijos sąnaudos (kWh/m^2/metai)	Energijos sąnaudos šildymui (kWh/m^2/metai)**	CO_2 kiekis (kg/m^2 /metai)***	Šilumos šaltinis(iai)	Vardas Pavardė
Išrašas	GD-0546-00008 2016-10-21 2026-10-21	4400-4262-7074 Parko g. 23, Panaros k., Varėnos r. sav.	Gydymo paskirties pastatai	A++	749	0	4	16.43	Šil.šaltinis_1: Šilumos siurblys / energija iš grunto	Karolis Januševičius
Išrašas	GV-0025-00640 2016-11-03 2026-11-03	4400-4249-6528 Pyvesos g. 13, Žadeikių k., Pasvalio r. sav.	Gyvenamosios paskirties 1 ir 2 butų pastatai (namai)	A++	130	0	1	6.84	Šil.šaltinis_1: Šilumos siurblys / energija iš oro	Rita Baltušnikienė
Išrašas	GV-0017-01282 2016-05-19 2026-05-19	4400-2686-6000 Kaimynų g. 4, Druskininkų m., Druskininkų sav.	Gyvenamosios paskirties 1 ir 2 butų pastatai (namai)	A+	67	0	25	31.15	Namo šildymas: Šildymas elektra	Rolandas Samajauskas
Išrašas	KG-0546-00009 2016-09-07 2026-09-07	4400-3966-1044 Karaliaučiaus 11E, Vilnius, Vilniaus m. sav.	Kiti gyvenamieji pastatai (namai)	A+	618	0	7	28.26	Šil.šaltinis_1: Šilumos siurblys / energija iš grunto	Karolis Januševičius
Išrašas	GV-0017-01371 2016-11-07 2026-11-07	4400-2722-8553 J. Čapliko g. 21, Kauno m., Kauno m. sav.	Gyvenamosios paskirties 1 ir 2 butų pastatai (namai)	A+	145	0	31	26.39	Pagrindinis šilumos šaltinis: Šildymas elektra, Papildomas šilumos šaltinis: Židiniai su kapsule, degimui naudojant išorės orą	Rolandas Samajauskas
Išrašas	KG-0314-01180 2017-03-08 2027-03-08	4400-4355-4692 Mykolo Lietuvio g. 27, Vilnius, Vilniaus m. sav.	Kiti gyvenamieji pastatai (namai)	A+	562	0	14	25.44	Šil.šaltinis_3: Dujinis katilas be greitaeigio vandens šildymo	Andrius Kirklys

Figure 1. Central EPCs register in Lithuania.

For new multi-family apartment buildings, an EPC is necessary for the completion of construction procedures, which means buildings can be registered as completed and in use, so there is no longer a need to certify separate apartments. This is also the case for buildings after major renovations. In the case of buying, selling or renting existing buildings, it is possible to certify a separate apartment if the whole building is not yet certified. For building units (apartments) in old existing buildings, it is possible to issue a typical EPC without detailed measurements and calculations.

The EPC of a building (building part) must include the unique number and address of the building, purpose and useful area of the building, energy performance class and estimated total energy inputs per m2 of heated area of the building (primary energy), data on the main source of heating, energy consumption for heating (primary and secondary energy), reference number of the building certificate, date of certificate issuance, expiry date of the certificate, and the name, certificate number and signature of the expert who issued the EPC (Figure 2). Every EPC also includes calculation results and recommendations for improvement.



PASTATO ENERGINIO NAUDINGUMO
SERTIFIKATAS

Nr. GV-0017-01451

1 lapas / 2 lapų

Pastato (jo dalies) unikalus pastato numeris: 4400-3085-4814
Pastato adresas: Lauksargio g. 85B, Vilniaus m., Vilniaus m. sav.
Pastato (jo dalies) paskirtis: Gyvenamosios paskirties 1 ir 2 butų pastatai (namai)
Pastato (jo dalies) šildomas plotas, m²: 355.95
Viso pastato šildomas plotas, m²: 355.95

Pastatų (jų dalių) energinio naudingumo klasifikavimas į klases*:

Nustatyta pastato (jo dalies) energinio naudingumo klasė: A+

A++
A+
A
B
C
D
E
F
G

* A++ klasė yra laikoma aukščiausia, ji nurodo energijos beveik nevartojantį pastatą, G klasė nurodo energetikai neefektyvų pastatą

Skaičiuojamosios metinės rodiklių vertės vienam kvadratiniam metrui pastato (jo dalies) šildomo ploto:

Neatsinaujinančios pirminės energijos sąnaudos, kWh/(m²·metai):	90.06
Atsinaujinančios pirminės energijos sąnaudos, kWh/(m²·metai):	6.96
Metinių atsinaujinančios pirminės energijos sąnaudų santykio su metinėmis neatsinaujinančios pirminės energijos sąnaudomis vertė, vnt.:	0.11
Šiluminės energijos sąnaudos pastatui šildyti, kWh/(m²·metai):	7.42
Šiluminės energijos sąnaudos pastatui vėsinti, kWh/(m²·metai):	32.82
Šiluminės energijos sąnaudos karštam buitiniam vandeniui ruošti, kWh/(m²·metai):	2.18
Suminės elektros energijos sąnaudos, kWh/(m²·metai):	21.77
Elektros energijos sąnaudos patalpų apšvietimui, kWh/(m²·metai):	0.90
Pastato į aplinką išmetamas CO_2 kiekis, kgCO_2/(m²·metai):	19.30

Sertifikavimo eksperto pastabos: Energinio naudingumo sertifikatas išduotas šildomoms patalpos. Garažas yra nešildomas.

Sertifikato išdavimo data : 2017-04-11 Sertifikato galiojimo terminas: 2027-04-11

Sertifikatą išdavė ekspertas Rolandas Samajauskas Atestato Nr.0017

UAB Pastatų sertifikavimo biuras

1 4 0 8 4 5

Figure 2. EPC format in Lithuania.

At the moment, there are approximately 146,500 EPCs registered for residential buildings (including EPCs for apartments in multi-family houses) and 12,000 EPCs for non-residential buildings (Figure 3).

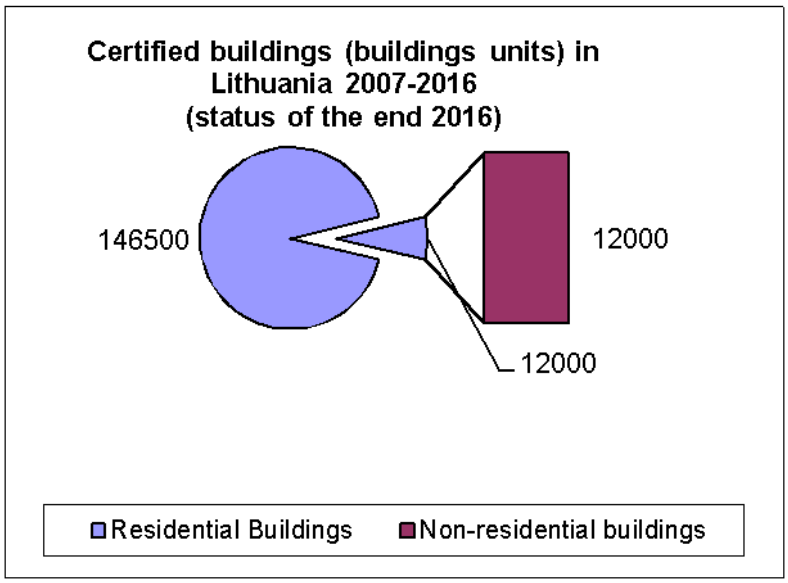


Figure 3. Certified residential and non-residential buildings in Lithuania, 2007-2016.

The certified buildings can be classified into nine classes: A++, A+, A, B, C, D, E, F and G. Class A++ indicates an NZEB, and class G indicates the least energy-efficient building (Figures 4 and 5).

Figure 4. New public building of energy performance class A++.

Figure 5. New public building of energy performance class B.

There are no fixed or pre-defined prices for the certification of energy performance of buildings in Lithuania. The EPC costs are regulated by the market and vary between 100 € and 5,000 €, depending on type, location, complexity, size, construction details and many other factors of the building. For an EPC of an apartment in a multi-family apartment building the certification costs are approximately 100 € and for a typical simplified EPC of an apartment in an old existing building the certification costs are approximately 15 €. The certification costs of a simple single-family house vary between 100 € and 350 €. The fixed registration fee of an EPC is 6 € and part of it is used to finance quality assurance.

The Experts' Training Programme, the teaching materials for examining qualified experts, and the rules and procedures for experts and their responsibilities were corrected and updated in 2012, 2014 and 2016. The new training programme as well as the teaching materials for qualified experts were prepared and adopted by the Ministry of Environment.

The main qualification requirements for building certification experts are the same for all types of buildings: an engineering degree with three years' experience in a construction branch, the completion of special 48-hour training courses and an exam, and practical experience in the certification of three buildings. The Experts Training Programme and the software tool were developed and adopted by the Minister of Environment in 2006 and updated in 2011, 2013, 2014 and 2016. The qualified expert for the certification of the energy performance of buildings shall have an additional 20 hours training and pass the exam every 5 years (Figure 6). There are no requirements that an expert must issue a minimum number of EPCs.

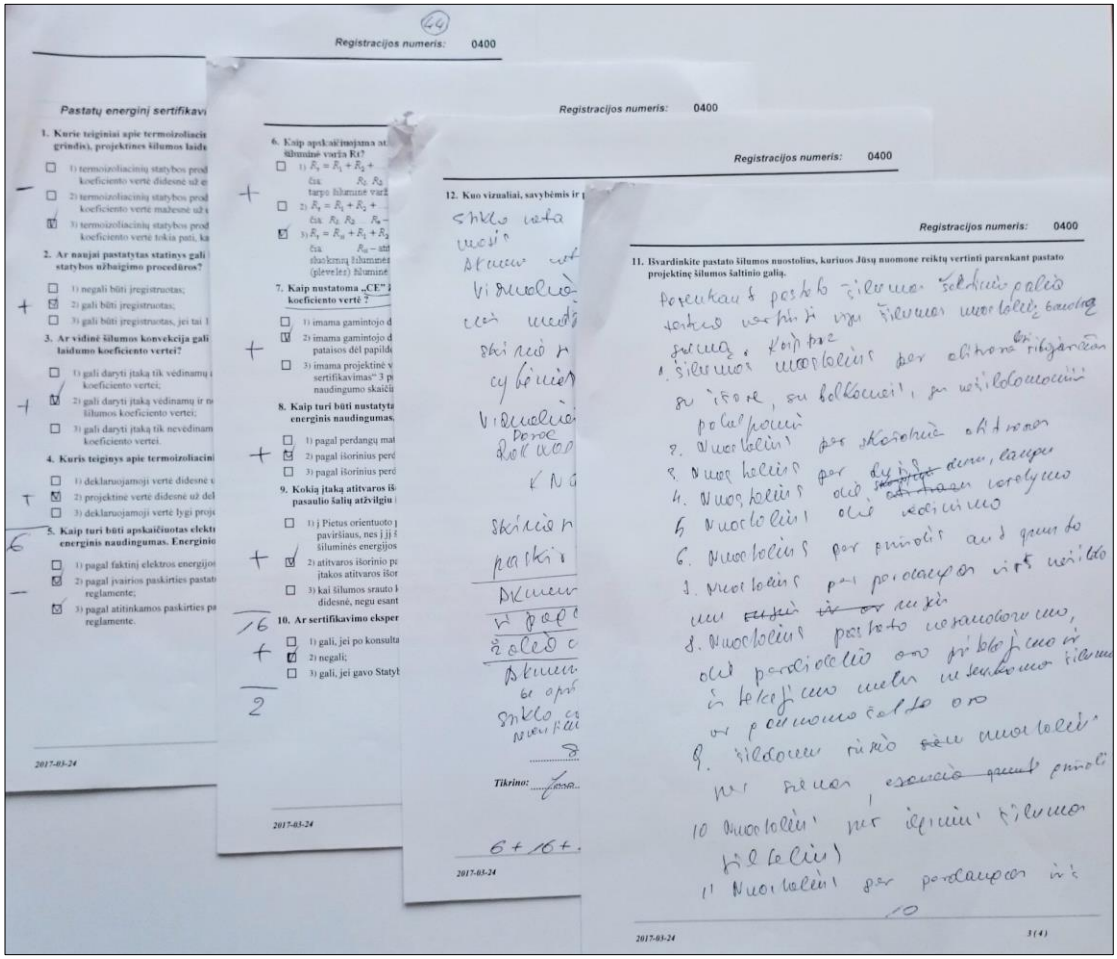


Figure 6. Experts' exams for the energy performance of buildings in Lithuania.

In Lithuania, there is an updated publicly available database, www.spsc.lt, and official register of qualified experts. At the moment, Lithuania has approximately 400 qualified experts with valid certificates for the certification of the energy performance of buildings; approximately half of these qualified experts are actively working on the market. In Lithuania, only a qualified expert can issue an EPC and is responsible for an objective certification process.

For new buildings, an EPC is necessary for the completion of construction procedures, which means a building can be registered as completed and in use. It is controlled by the State Territorial Planning and Construction Inspectorate under the Ministry of Environment. The same is applicable for buildings after major renovations. In the case of buying, selling or renting an existing building, EPCs are checked by a notary during the signing of real estate contracts. This is the main reason why the number of EPCs have significantly increased since January 2013, after new requirements for issuing of EPCs came into force (Figure 7).

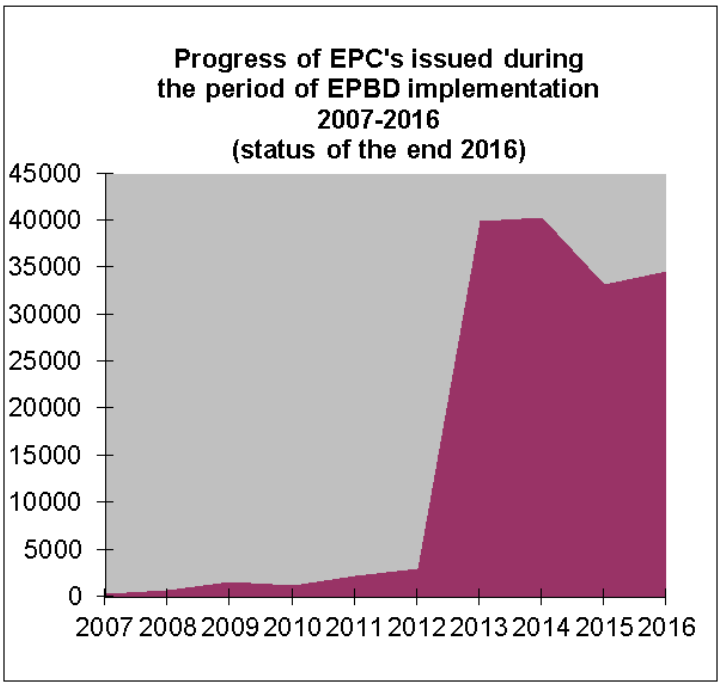


Figure 7. Progress of issued EPCs in Lithuania, 2007-2016.

Minimum requirements (the lowest acceptable energy performance class) are defined by Building Technical Regulation STR 2.01.02:2016 for buildings which have undergone major renovations (Figure 8). The construction procedures can be completed only if the EPC proves compliance with minimum requirements.

Figure 8. Renovated residential building, class A (class D before renovation).

2.III.ii. Quality assessment of EPCs

Lithuania has a single quality assessment system for different kinds of buildings. All EPCs for new as well as existing buildings are collected in the central database where they have been registered since 2007/2009. Every received EPC is automatically checked by the software for incorrect and/or incomplete data, software version, certificate validation and the completion of any additional training needed by qualified experts.

EPCs are selected for desk audits in cases where the values are out of range, or where the EPC shows a very high energy performance class. EPCs are selected for more detailed audits in cases where complaints have been received and in cases where many EPCs have been returned to the qualified experts for corrective actions; random selection according to the targeted percentage (not less than 0.5 % of all issued EPCs) is also practised.

Sanctions for incorrect EPCs may include a warning, an obligation to issue a corrected EPC for free, invalidation of the incorrect EPC, suspension of certificate, and the cancellation of the certificates of qualified experts. Any financial or other penalties for incorrect and/or insufficient certification works for qualified experts are not foreseen.

In Lithuania, during 2016, there were approximately 35,000 EPCs registered; 565 EPCs were returned to the qualified experts for corrective actions because of indicated mistakes and/ or inaccuracies, 12 EPCs were checked with a site visit and 98 EPCs were checked without a site visit.

The qualified experts were informed of their mistakes and/or warned and asked for the correct EPCs to be issued for free. An average of 30% of checked buildings are public buildings.

The aforementioned qualified expert scheme is quite simple and very effective.

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

According to the requirements of the Law on Construction issued on 9 January 2013, the energy performance certification of buildings is mandatory since 9 July 2015 for buildings occupied and frequently visited by the public with a total useful floor area of over 250 m^2 that have been constructed for accommodative, administrative, trade, service-orientated, catering, transport, cultural, educational, healthcare and leisure purposes. An energy certificate not older than 10 years must be placed in the building in a prominent place clearly visible to the public (Figure 9).

Figure 9. An EPC display in a new public building.

Compliance with this requirement is checked by the municipality supervising building maintenance. There are financial penalties in Lithuania of up to 289 € for building owners/managers that do not display the EPCs.

For new public buildings, EPCs are always checked by the State Territorial Planning and Construction Inspectorate under the Ministry of Environment. The same is applicable for buildings after major renovations. In the case of buying, selling or renting existing public buildings, EPCs are carefully checked by a notary during the signing of real estate contracts.

In Lithuania, the EPC, the assessors, the costs and the quality control scheme for public buildings and large buildings visited by the public are the same as for residential buildings.

As of 2016, there are approximately 12,000 EPCs registered for non-residential buildings. Certification of the energy performance of public buildings is mandatory in Lithuania. An average of 30% of controlled buildings are public buildings.

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

According to the Law on Construction in Lithuania, after 9 January 2013, when new and existing buildings or building units are sold or rented, the energy performance indicator of the building's EPC should be stated in the advertisements in commercial media. At the moment, there are no legal or financial penalties in Lithuania established and applied, and the control mechanism is not developed. The Ministry of Environment is responsible for the whole process and influences owners and real estate agencies using several publications and information campaigns.

Detailed official information, text and tools are available on the national websites. Primary information and related legal acts are already available on the national websites www.am.lt, www.spsc.lt; www.betalt.lt; www.enmin.lt.

3. A success story in EPBD implementation

A success story in Lithuania is a policy package for deep renovation based on finance and information supported by EPCs.

The Programme for the Modernisation of Multi-family apartment houses set in Lithuania's Resolution No 1213 of 23 September 2004 aims to provide support to home-owners of multi-family buildings who wish to implement energy efficiency measures. The programme began at the end of 2005. This is currently being revised as additional financial and other measures, that aim to encourage owners to renovate multi-family apartment houses and to support the involvement of low-income households with such energy saving projects, are envisaged.

The participants of the Programme were apartments owners, the Housing Energy Saving Agency, municipalities, commercial banks, housing loan insurance companies, housing administration companies, engineering consultancy companies (who prepare energy audits and investment proposals), contractors, etc.

The programme provides loans to increase the energy efficiency of buildings by replacing windows and doors, insulating ceilings, roofs and walls, installing solar panels and wind turbines, replacing energy related equipment and replacing elevators and electrical wiring in shared areas (stairwells, basements, etc.).

Additionally, the Lithuanian government negotiated the establishment of the JESSICA Holding Fund[7] to offer an attractive financing scheme to speed up major renovations. Lithuania is one of the first countries in the European Union to have used the JESSICA initiative to improve the energy efficiency of multi-family apartment buildings. Originally the fund size was projected to be 227 million € (127 million € from ERDF[8], as well as 100 million € from the Lithuanian national budget). The overall aim of the JESSICA Holding Fund is to contribute to increased energy efficiency in the housing sector by offering long-term financial support in the form of loans with preferential terms and conditions.

The JESSICA financing mechanism, developed in 2010, comprises about 30% of the state support value that pertains to rehabilitation projects from 2011 onwards and covers:

- 100% support for preparation of technical documentation and expenses for the supervision of construction works if EPC class D will be achieved;

- 15% support for implementing energy efficiency measures whereby EPC class D will be achieved;
- 100% support for low-income families.

Starting in 2013, the Lithuanian government decided to speed up the renovation process. A new model for the renovation of multi-family apartment buildings was developed whereby the loan lies with the project administrator, meaning the resident does not become burdened by debt.

In 2013, an additional incentive, funded by the Special Climate Change Programme, was set up to complement the JESSICA programme. The incentive provided an additional 10% investment cost grant that could be approved when the energy consumption of a building is reduced by at least 40%. The total subsidy for the renovation works is 40%. In the context of the scheme, the state, from its own budget, provides 100% of loan reimbursement for low-income households and 100% reimbursement for preparing and administering paperwork. JESSICA loans (with maturities of up to 20 years at a fixed annual interest rate of 3%) are offered to the owners of apartments or other premises in multi-family apartment buildings, provided they commit themselves to implementing energy efficiency measures and other measures set forth in the Investment Plan.

EPCs are carried out before the preparation of the Investment Plan (to obtain the necessary information about the condition of the building and recommendations) and after the completion of building renovation works (to check whether the measures set forth in the Investment Plan have been implemented).

The average investment for multi-family apartment building renewal is 200,000 €. This usually includes the insulation of external surfaces – roof and walls -, the replacement of windows and entrance doors, the modernisation and rebalancing of heating systems, and the installation of thermostatic valves. The value of signed construction contracts currently stands close to 150 million €, which makes up to 8.3% of the value of the country's whole construction sector last year.

The programme has already achieved significant results – between 2005 and 2016, 2,354 multi-family apartment buildings were renovated, and a further 769 buildings were renovated in 2016.

Information campaigns have been designed to work in parallel with the financial incentives as they have been directed towards the building owner, motivating the owner to use the incentives.

The Public Company Housing Energy Efficiency Agency (BETA)[9] gives special attention to the publicity of the multi–family apartment building renovation (modernisaton) programme. The main goals of the publicity campaign are to increase public awareness of the programme and thereby encourage apartment owners to join it, to ensure that the information is effectively provided to all target groups that might seek to take advantage of the support, and to develop a positive perception of the programme among the public (Table 3).

Target Groups	Main target	Direct contact:	Indirect contact:
Primary target group - final beneficiaries	Residents of apartments; chairpersons of multi-apartment associations and administrators; programme administrators appointed by the municipality	Seminars for residents; seminars for project managers and chairpersons of multi-apartment associations	Website; printed handouts (leaflets and posters); a detailed guide (handbook) which describes the entire renovation process steps (for project managers); the media; long-term projects in the popular internet portal *www.delfi.lt*; an intensive information campaign in the regional media; articles in the national and specialised media
Secondary target group	Associations related to the renovation process; local and national authorities; independent experts; opinion leaders; media; other (with an important focus on final beneficiaries during this communication process)	Seminars for project managers and chairmen of multi-apartment associations; seminars for investment planners, engineers and for contracting companies, etc.	
Other	Mayors, administrators, other stakeholders, all beneficiaries	Annual conference to summarise results which have been achieved during the year (conference organised by municipal mayors and administrators of the projects being implemented);	Renovation days in different cities of Lithuania (officially called "*Renovation days*" month, in which the Ministry of Environment and Housing Energy efficiency agency representatives meet with residents and other participants of renovation processes in different cities; free consultation line.

Table 3. Main target groups for the multi-family apartment building renovation programme's publicity campaign.

4. Conclusions, future plans

In the context of meeting its ambitious climate and energy targets for 2020, the buildings sector has become one of the priority areas for the Lithuanian government. Several legislative initiatives have been introduced for building renovations. One of them - the cost-optimal energy performance requirements - was introduced into national legislation and is used for new buildings as well as for renovation activities.

The current plans and initiatives implement the EPBD requirements to ensure that from 2019 all new buildings occupied and owned by public authorities are NZEB, and by the end of 2020 all new buildings are NZEB.

Lithuanian legislation transposing the EED complements the EPBD by encouraging ambitious renovations through the requirement to renovate annually 3% of the central governments' building stock to an energy performance level of class C. All central governmental buildings in Lithuania with a floor area of over 500 m^2 are taken into account. The adoption of the EED in 2012 was developed in order to help deliver the EU's 20% headline target on energy efficiency by 2020, as well as to pave the way for further improvements.

Endnotes

1. The calculation procedure is based on standards EN 15217:2005 and EN 15603.
2. The calculation procedure is based on standards EN 15217:2007 and EN 15603:2008.
3. According to the information of the state enterprise Centre of registry.
4. www.energy-cities.eu/IMG/pdf/infinite_solutions_lithuania.pdf
5. ERDF - European Regional Development Fund (www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuId=FTU_5.1.2.html)
6. www.betalt.lt
7. www.energy-cities.eu/IMG/pdf/infinite_solutions_lithuania.pdf
8. ERDF - European Regional Development Fund (www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuId=FTU_5.1.2.html)
9. www.betalt.lt

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