NATIONAL PLAN FOR INCREASING THE NUMBER OF NEARLY-ZERO ENERGY BUILDINGS

INTRODUCTION

The plan aimed at increasing the number of nearly zero-energy buildings (hereinafter referred to as the 'Plan') has been drafted in line with the provisions of Article 9 of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (hereinafter referred to as the 'Directive') (OJ 2010 L 153, p. 13).

The main purpose of the plan is to describe the national actions of Lithuania aimed at increasing the number of nearly zero-energy buildings. The action plan reviews the practical application of the definition of nearly zero-energy buildings, describes the newly adopted and planned measures for increasing energy efficiency, interim objectives for improving the energy performance of buildings in order to implement the objectives of the Directive, so that all new buildings are nearly zero-energy buildings by no later than 31 December 2020 and that after 31 December 2018 public authorities occupying and managing new buildings ensure that those buildings are nearly zero-energy buildings.

Practical application of the definition of nearly zero-energy buildings

The Law of the Republic of Lithuania on Renewable Energy (Official Gazette, 2011, No 62-2936) contains an initial definition of the concept of a nearly zero-energy building.

Nearly zero-energy building means a building that has a very high energy performance established in accordance with the normative technical construction documents. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable resources, including energy from renewable sources produced on-site or nearby.

The Law of the Republic of Lithuania on Construction (Official Gazette, 1996, No 32-788; 2001, No 101-3597) provides for minimum energy performance requirements for all buildings in Lithuania, and the Construction Technical Regulation STR 2.01.09:2012 'Energy Efficiency of Buildings. Energy Efficiency Certification' (hereinafter referred to as 'CTR') (Official Gazette, 2012, No 99-5071) establishes requirements for evaluating energy performance.

The calculation method referred to in the standard LST EN 15217:2007 'Energy performance of buildings – Methods for expressing energy performance and for energy certification of buildings' is used for evaluating energy performance of buildings.

In Lithuania, energy performance is unrelated to particular numerical value of energy consumption and is defined by the respective class of energy performance of the building.

According to energy performance, buildings are classified into 9 classes: A++, A+, A, B, C, D, E, F, G.

The Lithuanian legislation setting requirements for the energy performance of buildings does not use reference buildings. Each building is assessed individually. The requirements are based on the following principle: the legislation sets regulatory requirements for the heat characteristics of building envelopes, efficiency of engineering systems (cooling, preparation of domestic hot water, indoor lighting), energy consumption for cooling the building and other indicators for different buildings of class D, C, B, A, A+, A++. The legislation lays down analogous indicators for reporting buildings (of class D and E) (average indicator values of 50% of certain buildings using the lowest amount of energy).

The energy performance class of the building is identified on the basis of the following building indicator values (the compliance of all those values with the legislative requirements is assessed):

- calculated specific heat losses of building envelopes;

- building air-tightness;

- technical indicators for mechanical cooling system with recuperation;

- C_1 indicator value of energy efficiency of the building, characterising primary non-renewable energy efficiency for heating, ventilation, cooling and lighting;

- C_2 indicator value of energy efficiency of the building, characterising primary non-renewable energy efficiency for preparing domestic hot water;

- part of renewable energy used in the building.

Once the energy performance class of the building has been identified, the actual indicators of the building are checked against the normative indicators for the respective energy performance class.

The Construction Technical Regulation STR 2.01.09:2012 'Energy Performance of Buildings. Certification of Energy Performance' provides for the following details:

nearly zero-energy buildings are those that comply with the requirements of this Construction Technical Regulation for buildings of class A++ energy performance, i.e. buildings of very high energy performance with nearly zero-energy or very low energy consumption; most of the energy consumed is renewable energy, including renewable energy produced locally or nearby.

According to the established indicators, a building of class A++ must comply with the applicable parameters:

1. values C_1 and C_2 of energy efficiency indicators of the building must comply with the requirements of the Regulation, i.e. $C_1<0.25$ and $C_2\leq 0.70$;

2. calculated specific heat losses of building envelopes must not exceed the normative heat losses;

3. air-tightness of the building must comply with the requirements of the Regulation, i.e. in case of pressure difference of 50 Pa between the inside and outside of the building, air circulation must not exceed 0.6 times per hour;

4. if a building is equipped with a mechanical ventilation system with recuperation, the recuperator performance ratio shall be at least 0.90, and the amount of energy used by a recuperator ventilator must not exceed 0.45 Wh/m^3;

5. a part of energy from renewable resources consumed in the building shall comply with the requirements of the Regulation, i.e. in buildings of class A++, energy from renewable resources must form the largest part of energy consumed. A part of renewable energy consumed in the building K_{ers} (units) must be higher than 1 and needs to be calculated as follows:

$$K_{ers} = \frac{Q_{PRr} - Q_{PRr(H)} - Q_{PRr(C)}}{Q_{rKn} \sum_{m=1}^{12} Q_{E.eq.m} f_{PRn.E} - \sum_{m=1}^{12} Q_{E.em} f_{PRn.E}},$$

,

where ($Q_{PRn} - \sum_{m=1}^{12} Q_{E.eq.m} \cdot f_{PRn.E} - \sum_{m=1}^{12} Q_{E.e.m} \cdot f_{PRn.E}$) ≤ 0,

it is to be considered that the building uses only renewable energy, provided that

the requirement K_{ers}>1 is satisfied;

where:

$Q_{PRr(H)}$ means inefficiently consumed renewable energy in the building, where there is no energy requirement for cooling the building (kWh/(m^2*year)). This amount of energy shall be calculated on the basis of the 'm' data pertaining to particular months, where there is no cooling requirement;

$Q_{PRr(C)}$ means inefficiently consumed renewable energy in the building, where there is energy requirement for cooling the building (kWh/(m^2*year)). This amount of energy shall be calculated on the basis of the 'm' data pertaining to particular months, where there is a cooling requirement;

$Q_{E.eq,m}$ means energy costs pertaining to a particular month 'm' (kWh/(m^2*month)) of equipment existing in the heated premises of the building, i.e. energy costs not attributed to the energy performance indicators of the building.

$Q_{E.e,m}$ – electricity costs in an unheated area of the building pertaining to a particular month 'm' for other needs related to the purpose of the building (kWh/(m^2*month)), i.e. energy costs unrelated to energy performance indicators of the building;

$f_{PRn.E}$ means non-renewable primary energy factor for electricity (mean of different electricity production methods).

In line with the provisions of the Regulation, after assessing a sufficiently typical building area of 150-200 m^2 complying with class A++ building requirements, where biofuel is used for heating and preparing hot water:

- its non-renewable primary energy costs for heating, cooling and lighting – 7 kWh/m^2 of the heated building area per year and renewable energy forms the largest part of energy consumed in such a building;

- non-renewable primary energy costs for preparing hot domestic water – 5 kWh/m^2 of the heated building area per year.

Interim objectives for improving energy performance of new buildings

In order to properly implement the requirements of Article 9(1) of the Directive, no later than by 31 December 2020, so that all new buildings are nearly zero-energy buildings and that after 31 December 2018 public authorities occupying and managing new buildings ensure that those buildings are nearly zero-energy buildings, Lithuania has set transitional requirements for newly constructed buildings in 2014, 2016, 2018 and 2021 under building energy performance classes:

- prior to 2014 – new buildings or their parts shall comply with the requirements for class C buildings;

- from 2014 – new buildings or their parts shall comply with the requirements for class B buildings;

- from 2016 – new buildings or their parts shall comply with the requirements for class A buildings;

- from 2018 – new buildings or their parts shall comply with the requirements for class A+ buildings;

- from 2021 – new buildings or their parts shall comply with the requirements for class A++ buildings.

NOTE. In Lithuania, regulatory requirements are applied to heat losses for envelopes of buildings pertaining to a particular energy performance class. Indicators for parts of buildings pertaining to a particular energy performance class must be used for calculating normative heat losses of envelopes of the entire building pertaining to a particular energy performance class. The rules allow derogations from indicator values, however, this must be done so that the designed heat losses of envelopes of the entire building do not exceed the normative losses. The same principle shall apply for modernised buildings and their parts.

In view of the established requirements, in order for the building to fall within energy performance class B, its consumption of non-renewable energy for heating, cooling and lighting must be 1 or 2 times lower than that of class C buildings: for class A buildings, the costs shall be from 2 to 2,67 times lower; for A+ class buildings, the costs shall be from 2,67 to 4 times lower; for class A++ buildings, the costs shall be more than 4 times lower;

Consumption of non-renewable primary energy for heating, cooling and lighting

Please see the original document for the graph

In order for the building to fall within energy performance class B, its non-renewable primary energy consumption for preparing domestic hot water shall be at least 1.01 times lower than that for class C buildings, accordingly: for class A buildings it shall be more than 1.18 times lower; for class A+ buildings it shall be more than 1.25 times lower; for class A++ buildings it shall be more than 1.43 times lower.

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Consumption of non-renewable primary energy for preparing domestic hot water

Energy costs, sometimes compared to class C buildings

By 2014 From 2014 From 2016 From 2018 From 2021

Please see the original document for the graph.

Example:

1. Based on the provisions of the Regulation, after evaluating a typical 1-2 apartment residential building of 150 m^2, its non-renewable primary energy costs for heating, cooling and lighting are as follows:

- for class C – 192 kWh/m^2 of heated area of the building per year;

- for class A – 91 kWh/m^2 of heated area of the building per year;

- for class A+ – 53 kWh/m^2 of heated area of the building per year;

- for class A++, where biofuel is used for heating and preparing hot water – 7 kWh/m^2 of heated area of the building per year, and energy from renewable resources forms the largest part of energy consumed in the building.

Non-renewable primary energy costs for preparing domestic hot water in such buildings are as follows:

- for class C – 45 kWh/m^2 of heated area of the building per year;

- for class A – 40 kWh/m^2 of heated area of the building per year;

- for class A+ – 35 kWh/m^2 of heated area of the building per year;

- for class A++ – 5 kWh/m^2 of heated area of the building per year.

In a 1-2 apartment class A residential building of 150 m^2 the consumption of non-renewable primary energy for heating, cooling and lighting is about 2.1 times lower than that for a class C building. Accordingly, in a class A+ building, the consumption of non-renewable primary energy is about 3.6 times lower, and in a class A++ building it is 27.6 times lower than that for a class C building.

In such a class A building, non-renewable primary energy consumption for preparing domestic hot water is 1.14 times lower, in a class A+ building – 1.31 times lower, in a class A++ building – 8.3 times lower than energy costs in a class C building.

2. According to the provisions of the Regulation, after evaluating a sufficiently typical 1-2 apartment residential building of 200 m^2, its non-renewable primary energy costs for heating, cooling and lighting are as follows:

- for class C – 183 kWh/m^2 of heated area of the building per year;

- for class A – 88 kWh/m^2 of heated area of the building per year;

- for class A+ – 50 kWh/m^2 of heated area of the building per year;

- for class A++, where biofuel is used for heating and preparing hot water – 7 kWh/m^2 of heated area of the building per year, and energy from renewable resources forms the largest part of energy consumed in that building.

Non-renewable primary energy costs for preparing domestic hot water in such 1-2 apartment building of 200 m^2 are as follows:

- for class C – 45 kWh/m^2 of heated area of the building per year;

- for class A – 40 kWh/m^2 of heated area of the building per year;

- for class A+ – 35 kWh/m^2 of heated area of the building per year;

- for class A++ – 5 kWh/m^2 of heated area of the building per year.

In a 1-2 apartment class A building of 200 m^2 the consumption of non-renewable primary energy for heating, cooling and lighting is about 2.1 times lower than that for a class C building. Accordingly, in a class A+ building, the consumption of energy is about 3.6 times lower, and in a class A++ building the consumption of non-renewable primary energy is 27 times lower than that for a class C building. Costs of non-renewable primary energy for preparing domestic hot water in a class A building are 1.14 times lower, in a class A+ building – 1.31 times lower, in a class A++ building – 8.3 times lower than those in a class C building.

Construction permit documents, issued for residential building constructions in 2009-2011

Year	**Number of construction permit documents, in units**
2011	**4 824**
2010	**5 876**
2009	**5 994**

Of which - construction permit documents issued for one and two-apartment residential buildings:

Year	Number of construction permit documents, in units
2011	4 734
2010	5 764
2009	5 938

Of which – construction permit documents issued for two and more apartment residential buildings (multi-apartment buildings):

Year	Number of construction permit documents, in units
2011	90
2010	112
2009	56

Number of residential building constructions authorised in 2009-2011 according to the construction permit documents:

Year	**Number of residential building constructions authorised, in units**

2011	**4 951**
2010	**5 961**
2009	**6 021**

Of which – construction permits for one and two-apartment residential buildings:

Year	**Number of residential building constructions authorised, in units**
2011	4 854
2010	5 848
2009	5 964

Of which – construction permits for three and more apartment residential buildings:

Year	Number of construction permit documents, in units
2011	86
2010	106
2009	56

Useful area of apartment constructions authorised in 2009-2011 on the basis of construction permit documents:

Year	**Useful area of the apartment constructions authorised, thousand m^2**
2011	**948.2**
2010	**1 107.7**
2009	**1 0771**

Of which – useful area of apartments in the one or two-apartment residential building constructions authorised:

Year	Useful area of apartment constructions authorised, m^2
2011	800.6
2010	951.9
2009	979.1

Of which – useful area of three and more apartment residential building constructions authorised:

Year	Useful area of apartment constructions authorised, m^2
2011	147.6
2010	155.8
2009	98.0

Number of apartment constructions authorised in 2009-2011 with construction permit documents:

Year	**Number of apartment** constructions authorised**, in units**
2011	**7 290**
2010	**8 319**
2009	**7 553**

Of which – apartment constructions authorised in one and two-apartment residential buildings:

Year	Number of apartment constructions authorised, in units
2011	4 854
2010	5 848
2009	5 964

Of which – apartment constructions authorised in three and more apartment residential buildings:

Year	Number of apartment constructions authorised, in units
2011	2 136
2010	2 118
2009	1 321

Information about policy, financial or other measures approved for the purpose of increasing the number of nearly zero-energy buildings

(Including information about national measures and requirements related to the use of renewable energy in new buildings and buildings subject to major renovation within the field of application of Articles 13(4), 6 and 7 of Directive 2009/28/EC)

The Law on Renewable Energy Resources provides that:

- The Government or institutions empowered by it shall prepare and implement measures increasing the use of renewable energy of all types in buildings and highly improving energy efficiency, related to general energy production and nearly zero-energy buildings.

- From 31 December 2014, new and existing buildings that are subject to major renovation shall comply with the requirements for the use of renewable energy resources. The compliance with such requirements may be ensured by using centrally supplied heat and cooling energy, where renewable energy resources are largely used for the production of such energy.

- From 1 January 2012 new and existing buildings belonging to state and municipal bodies and companies and requiring major renovation must comply with the requirements for the use of renewable energy resources.

- The Government or an institution empowered by it shall establish the above requirements of this Article and the procedure for monitoring their implementation.

- The Government or an institution empowered by it shall prepare and approve financial support schemes for supporting construction of nearly zero-energy buildings.

- Municipalities shall include measures for increasing the use of renewable energy resources in their action plans for the development of use of renewable energy resources.

- The Government or an institution empowered by it shall prepare and approve the programme for the use of roofs for energy production from solar heat energy and solar light energy.

Energy efficiency action plans I and II and their objectives

The action plans review the existing situation in the field of energy consumption, evaluate energy saving potential, identify national energy saving targets, describe their calculation and strategy for attaining such targets.

The aim of the measure is to describe the measures completed (and still affecting energy saving) and ongoing from 1995 and to identify the measures to be taken in order to increase final energy efficiency and aimed at ensuring the attainment of national energy saving targets for 2008-2016.

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The second energy efficiency action plan (hereinafter referred to as the 'Action Plan') has been prepared in accordance with the provisions of Article 14(2) of Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (hereinafter referred to as 'Directive 2006/32/EC').

The main objective of the Action Plan is to describe the results of attainment of the national interim energy saving target for 2010. The Action Plan reviews the existing energy consumption, describes the newly approved and planned to approve energy efficiency improvement measures in order to increase final energy efficiency, and intended to ensure the attainment of the national energy saving target set for 2016.

The national energy saving target for a period of nine (2008-2016) years, identified in the first energy efficiency action plan, has been calculated in line with the requirements of Annex I to Directive 2006/32/EC, and amounts to 9%, compared to the final energy consumption average in 2001-2005. This amounts to 3797 GWh. Interim energy saving target for a three-year period (2008-2010) amounts to 1.5% of final energy consumption average in 2001-2005 and is 628 GWh.

The final amount of energy saved in 2010 amounts to 780 GWh and complies with 1.8% final energy consumption average in 2001-2005 established under the scope of Directive 2006/32/EC. The saved amount has been calculated by using the bottom-up method, by evaluating the amount of energy saved by each measure increasing energy efficiency. The savings generated by some energy efficiency improvement measures described in the Action Plan are not provided, as it is impossible to quantify their impact.

Horizontal measures – 76% (590 GWh), services sector – 14% (110 GWh) and domestic sector – 10% (80 GWh) were the ones that most impacted the attainment of the 2010 indicator. After evaluating the impact of the completed, ongoing and planned individual energy saving measures, the final amount of energy foreseen to save in 2008-2016 amounts to 3962 GWh and complies with 9.4% of the final energy consumption average for 2001-2005, as set under the field of application of Directive 2006/32/EC. It is foreseen that horizontal measures will amount to 31% (1240 GWh), energy sector will amount to 19% (740 GWh), industry - about 14% (565 GWh), domestic holdings - about 14% (558 GWh), transport sector - 12% (472 GWh), and the services sector will amount to 9% (374 GWh) of the identified saving target for 2016.

In order to increase energy performance of buildings and the number of nearly zero-energy buildings under the Cohesion Promotion Action Programme for 2007-2013, the following measures are being implemented in Lithuania:

1. The measure 'Renovation of multi-apartment buildings with the primary aim of increasing their energy efficiency' will help implement the objective of reducing the differences in the quality of the living environment in the capital and other cities of the country, by paying particular attention to improving housing conditions in problematic areas.

The aim of the measure is to renovate multi-apartment buildings, with the primary aim of increasing the qualities that determine their energy efficiency.

2. The ‘JESSICA holding fund’ measure will help with the objective of reducing energy consumption in residential houses, dormitories belonging to state high schools and professional training establishments, and encourage integrated city development activities.

The aim of the measure is to improve the funding conditions for projects in the area of improving the energy efficiency of the housing sector, encourage renovation (modernisation) of residential buildings and dormitories by property owners, state high schools and professional training establishments, in order to improve their energy qualities and living environment and encourage integrated city development activities in municipalities.

3. The measure ‘Promotion of renovation of multi-apartment buildings’ will help with the objective of reducing the energy costs for heating multi-apartment buildings and reducing CO_2 emissions, and will improve the living conditions of property owners.

The aim of the measure is to encourage the owners of apartments to modernise their multi-apartment houses with inefficient energy consumption.

4. The measure ‘Renovation of public buildings at national level' will help with the objective of improving energy production and consumption efficiency and the use of renewable energy resources.

The aim of the measure is to reduce the amount of energy consumed in buildings.

5. The measure ‘Renovation of public buildings at regional level’ will help with the objective of increasing energy production and consumption efficiency and the use of renewable energy resources.

The aim of the measure is to reduce the amount of energy consumed in buildings.

6. The measure 'Projects for the renovation of public buildings in line with the benefit and quality criteria of measure 1.2 ‘Ensuring stability of energy supply, accessibility and higher energy efficiency’ contained in the Lithuanian Single Programming Document for 2004-2006 will help with the objective of increasing energy production and consumption efficiency and the consumption of renewable energy resources.

The aim of the measure is to reduce the energy consumed in buildings.

7. The aim is to modernise most residential buildings built under construction permits issued prior to 1993, to reduce heating energy costs by up to 30%, compared to the heating energy costs prior to renovation (modernisation) and to reduce carbon dioxide emissions by about 400 thousand tonnes per year.

The aim of the measure is to encourage the owners of apartments in multi-apartment buildings to renovate (modernise) multi-apartment buildings, in order to improve living quality and make rational use of energy resources.

Note: the programme is to be continued during the new 2014-2020 financial period.

8. The use of the funds provided under the Special Programme for Climate Change will enable energy consumption to be reduced and production efficiency to be increased. This will be achieved by modernising residential and public buildings; renovating (modernising) public buildings by reducing energy consumption, renovating (modernising) one or two-apartment residential houses belonging to natural persons and private legal entities, by achieving class C building energy performance and by reducing energy consumption by at least 20%; constructing a public building with passive or low energy consumption or renovating (modernising) public buildings in order to achieve low or passive energy consumption.

In addition, these funds will encourage the use of renewable energy resources, and the implementation of environmentally friendly technologies, including effective energy production by means of cogeneration: use of renewable energy resources (solar, wind, geothermal energy, biofuel and etc.) in public buildings; and use of renewable energy resources (solar, wind, geothermal energy, biofuel and etc.) in individual residential buildings.

/Signed/ 11 09 2012

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