1. Introduction

In Latvia, the implementation of the Energy Performance of Buildings Directive (EPBD) is the overall responsibility of the Ministry of Economics. The Ministry of Economics develops and implements the national energy efficiency policy, including the transposition of the EPBD. The necessary laws and regulations for the transposition of the EPBD (Directive 2010/31/EC) that were adopted at the end of 2014 and are still in force are:

- the Law on the Energy Performance of Buildings (LEPB) that was adopted in the Latvian Parliament Saeima and came into force on 9 January 2013;
- the amendments to the Latvian Building Norm LBN 002-01 “Thermal requirements of the buildings envelopes” (LBN 002-01), setting out new minimal requirements for energy performance of buildings, which came into force on 22 April 2014. These requirements were again readopted in the Latvian Building Norm LBN 002-15.

This report presents an overview of the current status of the implementation of the EPBD in Latvia. It addresses the requirements for energy performance of buildings, for technical building systems, for Energy Performance Certificates (EPCs) and for inspection, experiences in EPBD implementation, as well as future plans.

2. Current status of Implementation of the EPBD

I. ENERGY PERFORMANCE REQUIREMENTS

I.i. Progress and current status

Energy performance requirements for external building envelope structures have been set since 2003, through the LBN 002-01 that was then replaced in 2015 by LBN 002-15.

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

Regulations

Minimum energy performance requirements are laid out in LBN 002-15 and Cabinet Regulation Number 907 of 28 September 2010 “Regulations Regarding the Survey, Technical Servicing, Current Repairs and Minimal Requirements for Energy Efficiency of the Residential House”.

Requirements for EPCs, requirements for inspections, and requirements for Nearly Zero-Energy Buildings (NZEB) are set in Cabinet Regulation No. 383 of 9 July 2013 “Regulations regarding Energy certification of Buildings”.

Energy performance methodology requirements are set in Cabinet Regulation No. 348 of 25 June 2013 “Building energy performance calculation method”.

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Requirements for independent experts are set in Cabinet Regulation No. 382 of 9 July 2013 “Regulations Regarding Independent Experts of Energy Performance of Buildings”.

Climate conditions in Latvia are described in Cabinet Regulation No. 338 of 30 June 2015 “Regulations regarding the Latvian Building Norm LBN 003-15 - Construction Climatology” (LBN 003-15).

**Minimum energy performance requirements**

LBN 002-15 requirements determine normative and maximum permissible heat loss of building elements (U-values) and of whole buildings, for three types of buildings:

- residential buildings, hospitals, kindergarten;
- public buildings (excluding hospitals and kindergartens);
- industrial buildings.

The minimum requirements apply for newly built, reconstructed and renovated heated buildings, as well as for new heated spaces to be added to existing buildings when their temperature during the heating season is maintained at 8 °C, or higher. Since 2003, requirements include calculation of the temperature factor k, which takes into account conditions of different climate zones and different indoor temperatures, which means that each building has different minimum energy performance requirements. Latvia is divided into ten climate zones, as defined in LBN 003-15. The amendments to LBN 002-01 from 22 April 2014 establish the minimum requirements for the external envelope structures of buildings closer to the cost-optimal level (Tables 1 and 2).

In Latvia, minimum energy performance requirements are set for building elements which are part of the building envelope, and, until November 2015, there are no energy consumption level requirements applied for newly built, reconstructed and renovated heated buildings. Regulation No. 907 determines the minimum energy performance requirements for existing residential buildings, i.e., the permissible energy performance level of a building, to be met, if necessary, through the uptake of energy performance improvement measures. The regulation decrees that the residential building administrator or owners shall plan measures for improving energy efficiency, including renovation, if the average thermal energy consumption of the house, during the last three calendar years, has exceeded 200 kWh/m².year or 150 kWh/m².year, if the heat is only used for house heating. The calculation of the average heat consumption of the last three calendar years takes into account the effective area of the building to be heated.

### Table 1:
**Change of requirements for the building envelope of residential buildings and approximate energy consumption for heating.**

<table>
<thead>
<tr>
<th>Envelope element</th>
<th>1980</th>
<th>1992</th>
<th>2003 (values after cost-optimal study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>0.90</td>
<td>0.33</td>
<td>0.20k</td>
</tr>
<tr>
<td>Floor</td>
<td>1.10</td>
<td>0.50</td>
<td>0.25k</td>
</tr>
<tr>
<td>Wall</td>
<td>1.10</td>
<td>0.42</td>
<td>0.30k</td>
</tr>
<tr>
<td>Window</td>
<td>2.40</td>
<td>2.20</td>
<td>1.80k</td>
</tr>
<tr>
<td>Door</td>
<td>2.40</td>
<td>2.20</td>
<td>1.80k</td>
</tr>
<tr>
<td>Thermal bridges</td>
<td>0.90</td>
<td>0.60</td>
<td>0.20k</td>
</tr>
<tr>
<td>Energy consumption for heating</td>
<td>150 - 200</td>
<td>100 - 130</td>
<td>70 - 90 - 60 - 80</td>
</tr>
</tbody>
</table>

### Table 2:
**Requirements (normative/maximum) for the building envelope after the cost-optimal study.**

<table>
<thead>
<tr>
<th>Heat Transmission coefficients</th>
<th>Residential, homes for elderly, hospitals and kindergartens</th>
<th>Public, excluding pensions, hospitals and kindergartens</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Envelope $U_{RN}$ / $U_{RH}$</td>
<td>$W/m^2.K$</td>
<td>$W/m^2.K$</td>
<td>$W/m^2.K$</td>
</tr>
<tr>
<td>Roofs</td>
<td>0.15k/0.20k</td>
<td>0.20k/0.25k</td>
<td>0.25k/0.35k</td>
</tr>
<tr>
<td>Floors</td>
<td>0.15k/0.20k</td>
<td>0.20k/0.25k</td>
<td>0.30k/0.40k</td>
</tr>
<tr>
<td>Walls</td>
<td>0.15k/0.23k</td>
<td>0.20k/0.25k</td>
<td>0.25k/0.30k</td>
</tr>
<tr>
<td>Windows</td>
<td>1.30k/1.80k</td>
<td>1.40k/1.80k</td>
<td>1.60k/1.80k</td>
</tr>
<tr>
<td>Doors</td>
<td>1.80k/2.30k</td>
<td>2.00k/2.50k</td>
<td>2.20k/2.70k</td>
</tr>
<tr>
<td>Thermal bridges</td>
<td>0.10k/0.15k</td>
<td>0.15k/0.20k</td>
<td>0.30k/0.35k</td>
</tr>
</tbody>
</table>

$k$ - temperature factor $k = 19/(\Theta_i - \Theta_e)$, depends on the indoor and outdoor air normative temperature values.

Note: The actual value for separate building elements may not meet the normative value, but the entire building must meet the total normative value.
**Energy performance methodologies**

The energy performance calculation methodology is applicable for new and reconstructed buildings, as well as for existing buildings, and is described in Regulation No. 348 of 25 June 2013. The energy performance calculation methodology is based on the corresponding CEN/TR 15615:2009, on standard EN ISO 13790:2008 conditions, and it also includes references to the 16 other standards.

The energy performance calculation methodology includes primary energy factors of non-renewable energy, using the values specified in DIN V 18599-1: 2011-12. These values have been customised in accordance with the Institute of Physical Energetics experts' calculations according to Latvian conditions. In general, the methodology prescribes the way to determine energy performance of the building, including variable calculation components. For example, thermal comfort requirements are set by other legal regulations for labour protection and hygiene, depending on building type and usage, whereas infiltration and air exchange rates are set by other building norms, values for thermal bridges are set by ISO standards, and values for shading coefficients and other often used parameters are set by annexes to Regulation No. 348. This regulation also contains references to LBN 002-15 and LBN 003-15, to include minimum energy performance requirements and climate conditions in building calculations. There are no officially approved guidance documents for calculating the energy performance requirements, but training materials issued by universities and certification institutions of independent experts can be used.

The construction company and each expert individually are responsible for building in compliance with the normative requirements. Regulation No. 382 includes requirements for independent expert activities. This regulation provides the competence requirements for independent experts, the procedures for certification, the procedures for registering and monitoring, as well as the data to be included in the independent expert register and the procedures of use of such data, as well as a penalty point system. At this stage, Latvia does not have an actual control system for compliance with energy performance requirements. Still, for each significant public building project (more than 100 visitors per day), a compliance check for energy performance requirements is carried out. Also, in every project claiming European funding, energy performance compliance is required. In any other building, if a complaint is received, the certification body has to check the EPC, energy audit or inspection report received by the independent expert. In the case of a violation, the certification body could apply penalty points. If the independent expert has 10 or more penalty points, he/she may be suspended for up to one year. If the independent expert has between 7 and 9 penalty points, he/she is suspended for 6 months. Since 2009, more than 60 cases have been initiated and, in approximately 30 cases, the certification body decided to suspend the independent expert.

The EPC register was completed in 2015, but certain legislative improvements are still necessary. The EPC registration software system is planned to begin running on 15 January 2016[1]. The software will allow for the issuing of EPCs and inspection reports, will provide for yearly random compliance checks, will act as a platform for communication between certification bodies, independent experts, and building owners, and will provide EPC statistical data, as well as average levels of energy consumption. This software will be included in the Building Information System (BIS).

I.iii. Cost-optimal procedure for setting energy performance requirements

To fully comply with the requirements of Directive 2010/31/EU according to the Regulation (EU) No. 244/2012 and its guidelines, calculations were done at the end of 2013 to determine cost-optimal energy performance requirements for new and existing buildings. According to these calculations, the existing minimal requirements in most types of buildings and building elements did not meet Latvia’s cost-optimal energy performance requirements. Amendments to LBN 002-01 from 22 April 2014 established new minimal energy performance requirements to move closer to cost-optimal levels, with an average improvement of 40% against 2003 requirements (see Table 2). The cost-optimal procedure also showed that the Latvian NZEB definition level is not achievable in an economically feasible way, so these requirements need to be reviewed.

I.iv. Action plan for progression towards Nearly Zero-Energy Buildings (NZEBs)

National application of the NZEB definition

In accordance with the LEPB, a NZEB is now defined as a building with a very high energy performance, using high efficiency systems for its energy supply. Detailed requirements for NZEBs are set out in Regulation No. 383, that states that new and renovated class A rated buildings are considered NZEBs if they meet the following requirements:

- the final energy demand for heating does not exceed 30 kWh/m².year, simultaneously ensuring indoor climate conditions in accordance with construction laws and requirements, as well as hygiene and labour protection requirements;
- the total primary energy consumption for heating, hot water supply, mechanical ventilation, cooling and lighting does not exceed 95 kWh/m².year;
- high-performance systems are used in the building, which:
  - provide at least 75% of ventilation heat recovery during the heating period;
  - provide at least partial use of renewable energy;
  - there is no low-efficiency fossil fuel heating system installed in the building.

According to the cost-optimal study, these requirements, set in 2013, are not attainable in an economically reasonable way. Therefore, Latvia is developing another study to produce a new NZEB definition and values in 2015.

Figures and statistics on existing NZEBs

Experience in the construction of low energy buildings in Latvia began in 2012, when the Ministry of Environmental Protection and Regional Development started a project called “Low energy buildings” (LEB) within the Latvian governmental programme “Climate Change Financial Instrument (CCFI)”. The LEB project supported the construction of new buildings and the reconstruction of existing ones to achieve target values. Within the LEB, 14 different projects were realised for different building types. Almost all projects were finished in 2013. Monitoring results of the implemented CCFI projects after one year of NZEB operation/exploitation (at the end of 2014) will be evaluated and will allow Latvian authorities to develop further targets for NZEB (Figure 1).


In 2014, Latvia developed a long-term strategy for building renovation. This strategy[2] includes information about Latvian building stock statistics, policies and measurements for the promotion of building renovation and Latvian objectives for energy performance.

Since 2012, Latvia annually collects information about the energy performance of central government buildings. A list of the central government buildings that do not meet minimum requirements is published[3].

To meet the 3% renovation rate of the total floor area as mentioned in Article 5 of the EED, Latvia has since 2012 renovated 232,635.36 m² of central government buildings, which fulfils the Latvian 3% target rate until 2017. After 2017, Latvia is planning a programme for central government building renovation that should begin in 2016.

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II. REQUIREMENTS FOR TECHNICAL BUILDING SYSTEMS (TBS)

Energy performance requirements for ventilation, cooling, lighting and hot water systems in Latvia are not yet exactly defined. The “Latvian Building Norms and Construction Law” gives specific system values, which affect energy performance ratings, but it does not specify the precise energy performance rating levels of those systems. The systems have to be designed in such a way that under normal operating conditions during the entire period of operation, energy consumption shall be as low as possible. Systems should also be designed and installed in such a way that their efficiency should not be below the applicable standards.

A section on equipment control and automation systems should be included in the Latvian plans for technical design of new buildings and renovation. EU funds and national competitions support the installation of intelligent energy metering and energy substation (heat and electricity) automation projects. Recently, the implementation of such system renovation projects has been increasing. In 2012, Latvia carried out a cost-benefit analysis of smart metering implementation, for both electricity and gas sectors. The analysis showed that the introduction of smart metering is economically reasonable for some industrial customers in the commercial sector, but it is not justified for households.

III. ENERGY PERFORMANCE CERTIFICATES (EPCs) REQUIREMENTS

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

Overview and administration system
Energy performance certification of buildings is regulated by the LEPB and Cabinet Regulation No. 383 and is supervised by the Ministry of Economics. The LEPB mandates that certification of the energy performance of residential or non-residential buildings must be undertaken in the following circumstances:

> a building under design, reconstruction or renovation, in order to approve it for use or sale;
> an existing building for sale, rent or lease, if certification of the energy performance is requested by the purchaser, tenant or lessee;
> an existing public building under state or local government ownership, the heating area of which exceeds 250 m².

How flats are certified in apartment buildings
The LEPB mandates that certification for an individual building unit has to be performed only if thermal energy is accounted for individually, otherwise, a single EPC applies to the whole building.

Format and content of the EPC
The EPC format is set out in Cabinet Regulation No. 383. EPCs are all of the same format, although there are two kinds of certificates:

> EPCs for existing buildings (Figure 2);
> temporary EPCs for new, reconstructed or renovated buildings (Figure 3).

![Figure 2: Energy Performance Certificate for existing buildings.](image-url)

![Figure 3: Temporary Energy Performance Certificate for new and renovated buildings.](image-url)
For the certification of existing buildings, both a calculated energy rating (asset rating) and a measured energy rating (operational rating) must be determined. The EPC, valid for 10 years, must be issued by an independent Qualified Expert (QE).

For the certification of new, reconstructed or renovated buildings, a calculated energy rating (asset rating) must be determined, and the temporary certificate, valid for 2 years, must be issued by a QE.

The energy performance must be expressed using the following annual energy performance indicators:

- final energy consumption, in kWh/m².year;
- carbon dioxide emissions, in kg CO₂/m².year;
- primary energy consumption, in kWh/m².year.

The EPC must contain information about the total final energy consumption (MWh/year) and the overall energy performance indicator (kWh/m².year) for heating, cooling, Domestic Hot Water (DHW), lighting (optional for residential buildings), ventilation, and other needs (that must be indicated).

The classification system for the energy performance of buildings is determined in Regulation No. 383, which classifies buildings by the energy performance indicator for heating. Calculated energy performance indicators must be presented on an energy performance scale[4] (Figure 4), one side of which is rated 'very good' - class A - high efficiency class buildings, and the other one 'very bad' - class F. The energy performance calculation model has to be validated using measured energy consumption (the difference between the calculated and the measured energy consumption cannot be greater than 10%, or no higher than 10 kWh/m² under identical indoor conditions).

**EPC activity levels**

For new and reconstructed or renovated buildings, the EPC is mandatory and control is undertaken by the municipal construction inspection authority, when approving the building for use. For existing buildings, certification requirements are the joint responsibility of the buyer and the seller and no check is performed by any third party. The current compliance rate with energy performance certification requirements for existing buildings is considered poor, but is steadily improving. About 1,000 EPCs are issued yearly for new and existing buildings. Accurate data will be available after the EPC registration software is put into the production environment in 2016.

**Typical EPC costs**

The cost of the assessment of energy performance of buildings is not regulated. For typical apartment buildings (simple geometric shape, with district heating and natural ventilation), the EPC costs usually range from 300 € to 600 € for the whole building. For non-residential buildings, EPC costs range from 300 € to 700 € for the whole building.

**Assessor corps**

The requirements and certification procedures for QEs, the registration and monitoring procedures of QEs, as well as the content and procedures for the QE register, are determined by Regulation No. 382.

A QE certified for both types of EPCs must have a relevant university degree, theoretical knowledge and practical experience, and pass a proficiency exam. QEs must be either heating engineers and technicians, or building structural engineers. A temporary EPC can also be issued by QEs who have received a building practice certificate in the field of structural building design, in accordance with the procedures specified by regulations concerning construction.

The certification of QEs is performed by certification bodies. Certification bodies supervise the professional activities of the QEs.

The number of QEs is shown in Figure 5.

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Compliance levels by sector

In Latvia, EPCs have been issued since 2010. Right now, the compliance level by sector is rather low. Usually, QE services are used for issuing EPCs and energy audits for projects financed by European funds, where compliance checks of energy performance are required for every single project. Requirements for these projects are constantly growing and, through this process, the competence level of QEs is also increasing.

Enforcement with building owners and real estate actors

The requirement for issuing an EPC receives more support from professionals (e.g., QEs) than from the general public (owners, tenants, or buyers) who tend to see the EPC as another bureaucratic burden. Therefore, despite the legislation that allows tenants or buyers to ask for EPCs on a voluntary basis, they often do not, so energy performance certification of buildings still has only a minor effect on the real estate market. This is also because there are no penalties for owners of existing buildings. Latvia is, however, planning to develop a valid penalty system. There is hope that this situation could change after the implementation of the BIS, because this is planned to offer a specific information package for each individual address and, thus, in the future, purchasers and tenants will be able to see if a building has an EPC or not, before they make a decision.

III.ii. Progress and current status on public and large buildings visited by the public

Overview

EPCs are mandatory for public central and local government buildings with a total floor area larger than 250 m². This requirement is valid, but not yet completely operational. Only approximately 20% of central government buildings have EPCs as of 2015. A renovation contest for central and local government buildings using EU funds is planned in 2016, and a valid EPC will be required. Until then, the Ministry of Economics is not requiring public central and local government buildings to have an EPC.

Information and requirements on experts, EPC format and quality control, as well as typical EPC costs are the same as for other EPCs previously described.

III.iii. Implementation of mandatory advertising requirement

The LEPB decrees that advertisements for the sale, rent or lease of any building, or building unit, should display the energy performance indicators of the building, or building unit, if certification of the energy performance of the building has already been performed in accordance with the procedures specified in this Law. This requirement is not fully effective, because there is no penalty system. Latvia is developing a valid penalty system during 2016.

III.iv. Information campaigns

A campaign for the improvement of the energy performance of buildings in Latvia, the so-called “Living warmer” campaign (Figure 6), was launched on 25 February 2010, when the Ministry of Economy, Industry Associations and Business signed a cooperation memorandum at the conference “Housing renovation - Latvian investment in the future”.

The key objective of the Living warmer campaign is to inform households about the possibility and conditions of support from the EU 2007 - 2013: “Improvement of Heat Insulation of Multi-Apartment Residential Buildings” programmes. More than 186 informative events have been held throughout Latvia - a variety of public debates, seminars, conferences and exhibitions, involving more than 8,500 participants in total.
The government has awarded a contract to promote best practices in the field of energy-efficient building construction, renovation and reconstruction since 2011 (“Energy efficient building in Latvia”).

The “Latvenergo” Energy Efficiency Center advises the public and private sector about the possibilities to improve the efficient use of electricity and the use of a variety of electrical appliances for individual use.

The Efficiency Information Center (EEIC) of the Riga Energy Efficiency Agency provides visitors with free of charge information and advice about energy efficiency, including advice on preparing applications for renovation and energy audits. It also organises open days at renovated homes, as well as discussion seminars on the quality of the renovation.

The Zemgales Regional Energy Agency provides advice, information and training services in the field of energy efficiency, and maintains a database of energy consumption, prepares regional and local planning documents in the energy sector and coordinates its implementation, while also attracting investments to improve energy efficiency.

The Latvian Climate Change Financial Instrument awarded a contract “Public awareness with regard to greenhouse gas emission reduction and the importance of opportunities” (Phases I and II) with the aim to inform the public about the opportunities to reduce greenhouse gas emission.

### III. v. Coverage of the national building stock

The total number of energy consuming residential buildings in Latvia is 352,400, with a total floor area of 86.9 million m², and the total number of non-residential energy consuming buildings is 34,300, with a total floor area of 27.0 million m².

By the end of 2014, approximately 1% of the building stock in Latvia has an EPC.

### IV. INSPECTION REQUIREMENTS – HEATING AND AIR-CONDITIONING (AC) SYSTEMS

#### IV.i. Progress and current status on heating systems

**Overview, technical method and administration system**

Cabinet Regulation No. 383 determines that inspection of boilers and heating systems is mandatory for heating systems with a boiler with an effective rated output over 20 kW, as well as for Air-Conditioning (AC) systems with an effective rated output over 12 kW.

The number of heating system inspections is fairly low due to low interest from building owners. After the BIS platform becomes operational, this should improve.

Apartment buildings in Latvia are generally not equipped with AC systems for cooling. When they are installed, the total power of the AC systems in separate rooms usually does not exceed 12 kW. So, the number of AC systems requiring inspection is small.

**Arrangements for assurance, registration and promotion of competent persons**

Cabinet Regulation No. 383 provides that an independent expert auditor shall assess the boiler together with the heating system, shall provide an opinion regarding the boiler’s efficiency, and shall provide recommendations about possibly replacing it, or other possible changes to the heating system and alternative solutions to reduce energy consumption and carbon dioxide emissions. The independent expert shall then draw up an inspection report on the inspection of the heating system, including the inspection results and recommendations for improving the inspected systems, provided that the

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[8] www.zrea.lv
implementation costs of the relevant measures are cost-effective during the anticipated (planned) period of service.

The inspection of boilers must be done in accordance with standard LVS EN 15378:2009 L “Energy performance of buildings: Inspection of boilers and heating systems” (Figure 7).

The inspection of AC systems includes an evaluation of effectiveness and recommendations. The independent expert then makes an inspection report. The format of the inspection report (deed) for AC systems is prescribed in Annex G of the standard LVS EN 15240:2009 L “Ventilation for Buildings - Energy performance of buildings: Guidelines for the inspection of air-conditioning systems”.

**Qualifications and entrance requirements**

An independent expert must have the required theoretical knowledge and practical experience, and also pass a proficiency exam.

In order to undertake heating system inspections, the independent expert must have a relevant university degree providing knowledge in the following fields:

> boilers and heating systems;
> measurements, and adjustment of equipment.

The inspection of boilers can also be performed by professionals who have received a building practice certificate in the area of construction of heating and ventilation systems, in accordance with the procedures specified by regulations on construction.

The number of independent experts is shown in Figure 5.

Independent experts for AC system inspections must have a relevant university degree providing knowledge in the following fields:

> AC equipment and systems;
> measurements, and adjustment of equipment.

AC system inspections can also be performed by professionals who have received a building practice certificate in the area of construction of heating and ventilation systems, in accordance with the procedures specified by regulations on construction.

The certification of independent experts for inspection of heating and AC systems is performed by the accredited “Certification Body of The Latvian Association of Heat, Gas and Water Technologies Engineers”. The certification body supervises the professional activities of the independent experts.

**Quality control of inspection reports**

Because the BIS is still in the process of implementation, there are no statistical data yet available about inspection reports issued every year. No penalties have yet been levied on independent experts of the inspection of boilers and heating systems in Latvia.

**Costs and benefits**

The number of independent experts for AC system inspections must have a relevant university degree providing knowledge in the following fields:

> AC equipment and systems;
> measurements, and adjustment of equipment.

AC system inspections can also be performed by professionals who have received a building practice certificate in the area of construction of heating and ventilation systems, in accordance with the procedures specified by regulations on construction.

The certification of independent experts for inspection of heating and AC systems is performed by the accredited “Certification Body of The Latvian Association of Heat, Gas and Water Technologies Engineers”. The certification body supervises the professional activities of the independent experts.

**3. A success story in EPBD implementation**

Cost-optimal calculation results show that the cost-effective measures for existing multi-apartment buildings are facade insulation, attic insulation and window replacement.

Based on the cost-optimal calculations for existing single-family houses, the insulation of the attic and roof are refundable.

The cost-effective measures for existing school buildings are the insulation of external walls, the insulation of the attic and plinth, as well as the replacement of windows and doors. However, insulation of the roof was found to be cost-effective only in one case study.

Cost-effective measures for existing kindergarten buildings are thermal insulation, insulation of the plinth, and replacement of windows.

In existing office buildings, cost-effective measures are found to be the insulation of exterior walls, and the insulation of the loft and the plinth.

The cost-optimal measures for multi-apartment buildings are insulation of the outer walls of the buildings, additional insulation of the plinth, replacement of windows and insulation of basement ceiling.

The results of the cost-optimal calculations at the level of individual elements demonstrate that the current requirements for new, reconstructed or renovated buildings are below the cost-optimal level.
The conclusions and proposals of the cost-optimal study helped to establish new minimal requirements for buildings and building elements that were included in LBN 002-01.

4. Conclusions, future plans

Latvia will develop further policies and take measures to increase the number of Nearly Zero-Energy Buildings (NZEBs). Taking into account that Latvia has no prior experience of NZEB construction, the process of defining targets is still in the research stage. Monitoring results of the realised/implemented projects after one year of NZEB implementation (at the end of 2014) will be evaluated and will allow Latvia to develop further targets for NZEBs. Latvia will efficiently implement the “Programme for renovations of Multi-apartment Housing, public buildings and industrial buildings for energy efficiency measures and renewable resources” during the EU planning period 2014 - 2020, finding the most effective financial mechanisms (e.g., loans, grants) for the implementation of the Programme.

Latvia shall implement the Building Information System (BIS), where information on Qualified Experts (QEs), Energy Performance Certificates (EPCs), and inspection reports will be monitored and accumulated. The analysis of BIS data will help to identify unrepresentative performance indicators and select cases for detailed examination.

Latvia will review the existing classification system of energy performance of buildings set out in Regulation No. 383, according to the cost-optimal calculations.

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The sole responsibility for the content of this report lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.


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