



# CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS

## EPBD Implementation in Slovenia

Status in December 2016

### AUTHORS

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### NATIONAL WEBSITES

[www.mzi.gov.si](http://www.mzi.gov.si), [www.energetika-portal.si](http://www.energetika-portal.si), [www.ekosklad.si](http://www.ekosklad.si), [www.eu-skladi.si](http://www.eu-skladi.si),  
[www.energetskaizkaznica.si](http://www.energetskaizkaznica.si)

## 1. Introduction

The transposition of the EPBD in Slovenia is the overall responsibility of the Ministry of Infrastructure and is primarily transposed by the Energy Act<sup>1</sup>, covering the topics of NZEB, energy performance certification, inspection of heating and AC systems and energy efficiency information programmes. In addition, the Building Construction Act gives the legal basis for building codes (with minimum requirements for building energy performance, technical building systems and the calculation methodology), while the Environmental Protection Act addresses the inspection of boilers.

A proposal for the amendment of the Energy Act was put to public consultation in February 2017. The proposed changes establish the obligation for public display of the EPC for all buildings (not only public) frequently visited by the public. The proposed amendment also gives the grounds and conditions to extend the validity of licences of independent experts. The publication of the amendment is expected by the end of 2017.

In the secondary EPBD regulation only minor changes have been implemented (since December 2015), including an update to the rules on the training, accreditation and register of accredited independent experts for regular inspection of AC systems<sup>2</sup>, completed in January 2016.

The revision of the building codes (PURES) is in progress and planned for publication in mid-2018. It will contain detailed technical requirements for NZEB based on the technical definition given in the national NZEB action plan (April 2015), and the revision of the calculation methodology according to a new set of CEN EPBD standards.

Important recent steps in EPBD implementation are the application of the central national electronic register of EPCs and associated software, the independent control system for EPCs, first steps in the cross-linking of e-registries for EPCs, inspections and public buildings, as well as wide information activities implemented by the Eco fund<sup>3</sup> concerning financial instruments available for the energy renovation of buildings.

## 2. Current Status of Implementation of the EPBD

### 2.1. Energy performance requirements: NEW BUILDINGS

#### 2.1.i. Progress and current status of new buildings

In line with the EPBD and according to the long-term planning integrated into the building codes PURES 2010, as of January 2015 more severe minimum requirements for maximum energy needs for heating have entered into force<sup>4</sup>. This change had already been integrated into the transitional provisions of PURES 2010 and is compliant with the cost-optimal study outcome. Minimum requirements are expressed using performance-based and energy-related requirements as well as detailed technical requirements for building components and systems.

In 2015/2016, the building codes were put under revision in order to take into account the outcome of the cost-optimal study, and mainly to include further details associated with the national definition of NZEB, and to make the necessary changes in the calculation methodology pursuant to the new CEN EPBD standards. The revision process is still ongoing and shall be finalised by mid-2018 with the publication of the updated rules.

The current development deploys detailed energy modelling for new non-residential buildings and the increased use of RES and RES systems, respectively. To support this process, the revised building codes plan to introduce obligatory (instead of optional) hourly energy calculations for complex non-residential buildings as well as to regulate the quality control of the airtightness of the envelope.

#### 2.1.ii. Format of national transposition and implementation of existing regulations

The Slovenian building codes PURES 2010, with the more severe minimum requirements in use from January 2015, are valid for all types of new buildings, residential and non-residential, while for public buildings (public investments) 10% more severe minimum requirements are imposed. However, new public buildings are front-runners in energy efficiency due to the financial incentives available for early NZEB as well as due to the Decree on green public procurement<sup>5</sup> that included low primary energy among the selection criteria for bids.

Compliance with PURES 2010 must be demonstrated by fulfilling minimum requirements related to the maximum allowed specific transmission heat losses ( $Ht'$ ), maximum annual heat demand for space heating ( $Q_{nh}$ ), maximum energy needs for cooling ( $Q_{nc}$ ) (for residential buildings only), and maximum primary energy for the energy systems operation (heating, ventilation and air-conditioning systems and lighting).

Maximum U-values of the envelope elements are prescribed for all buildings. The use of 25% of RES is mandatory in all new buildings from 2008; alternatively, solutions that include a comparable impact on the

primary energy are possible. The consideration of RES produced on-site is limited to the total final energy used for the building's energy systems; the consideration of exported RES is subject to the integration of the new CEN EPBD standards into the revised rules (by mid-2018).

The detailed minimum requirements and energy performance calculation methodology are given in the corresponding technical guidelines TSG-01-004<sup>6</sup>. A monthly energy calculation is predominantly used in practice, and energy modelling with the CEN EPBD standards validated tools is optional. Other minimum requirements cover thermal bridges, airtightness, shading, ventilation, heat recovery, cooling, lighting for residential and non-residential buildings, boilers and heat pump efficiency.

Compliance checking is done at the building permit stage, during the construction process and at building completion before the permission to use is issued. Full compliance is necessary for permission to use.

Advanced control is in place for early NZEB, mostly as a precondition for financial incentives.

<b>Maximum heating need (QNH) per useful conditioned floor area (Au)</b>	
for residential buildings	$QNH/Au \leq 45 + 60 f_0 - 4.4 TL$ (kWh/(m <sup>2</sup> year))
for non-residential buildings	$QNH/Ve \leq 0.32 (45 + 60 f_0 - 4.4 TL)$ (kWh/(m <sup>3</sup> year))
for public buildings	$QNH/Ve \leq 0.29 (45 + 60 f_0 - 4.4 TL)$ (kWh/(m <sup>3</sup> year))
<b>Maximum cooling need (QNC) per useful conditioned floor area (Au)</b>	
for residential buildings	$QNC/Au \leq 50$ kWh/(m <sup>2</sup> year)
<b>Maximum primary energy (Qp) per useful conditioned floor area (Au)</b>	
for residential buildings	$Qp/Au = 200 + 1.1 (60 f_0 - 4.4 TL)$ kWh/(m <sup>2</sup> year)

### **2.1.iii. Action plan for progression to NZEB for new buildings**

The Slovenian national plan for NZEB<sup>7</sup> (2015) imposed the technical definition of NZEB based on the cost-optimal study (2014) for reference buildings. The primary energy as a core performance indicator of NZEB is limited to 75 / 80 / 55 kWh/m<sup>2</sup>.year for new single- and multi-family houses and for non-residential buildings, respectively, and complemented by the requirement of a 50% share of RES in the final energy use. RES may be selected in consideration of their availability and acceptable NZEB technologies. In the future, the use of RES will be increased due to the growing share of RES in district heating systems which are subject to comply with the 2020 energy efficiency targets set in the Energy Act. The nearly zero or very low amount of energy required is achieved by the limitation of energy needs for heating to a maximum value between 25 kWh/m<sup>2</sup>.K and 15 kWh/m<sup>2</sup>.K (EPC class A1, A2 or B1), depending on the shape factor (envelope area to buildings volume ratio) and the local climate.

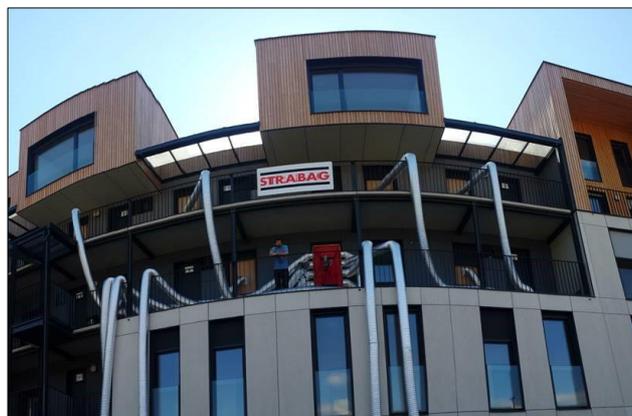
A number of policies support the early construction of NZEB, including the following: the integration of NZEB criteria in revised building codes, the integration of energy efficiency in spatial planning, financial instruments for supporting private and public investments of new NZEB, demonstration projects, incentives for heating from RES (on-site, nearby and/or in district heating systems), the integration of NZEB criteria in green public procurement, energy information and advice, establishing a one-stop-shop portal, and the upskilling of blue collar workers and engineers for NZEB.

The national plan for NZEB also defined the intermediate targets for future NZEB, expressed in the floor area of new NZEB, and diversified by particular building types: single-family houses, multi-family houses, public buildings and other non-residential buildings. Comprehensive monitoring of newly constructed NZEB is not yet in place; the partial data are available only for NZEB supported by Eco Fund subsidies (Table 1).

Single-family houses are the prevailing type of early NZEB in Slovenia; after a decade of tradition in constructing passive houses, low energy single-family houses and NZEB, there are several experienced designers, contractors and installers available within the single-family houses market. Although the stakeholders of multi-family building construction turned out to be less experienced in NZEB, there are some successfully built private and public NZEB multi-family houses. In 2016, the Housing Fund of the Republic of Slovenia completed a NZEB multi-family house with 52 apartments in 4 individual staircases. This demonstration building has an average U-value of  $0.26 \text{ W/m}^2\text{K}$ , EPC class A2, a primary energy of  $36 \text{ kWh/m}^2\text{year}$  and a 72% share of RES (Figure 1).



*Figure 1: NZEB multi-family house F3 Brdo, Ljubljana, built in 2016 as a demonstration project by the Housing Fund of the Republic of Slovenia (SSRS). The F3 Brdo building, with 52 apartments and a useful floor area of  $5,708 \text{ m}^2$ , holds an EPC class of A2 with a standard annual heat demand of  $14 \text{ kWh/m}^2\text{.year}$ , a total delivered energy of  $49 \text{ kWh/m}^2\text{.year}$  and a primary energy of  $36 \text{ kWh/m}^2\text{.year}$ . The share of RES in delivered energy is 72% (biomass: 48%, electricity: 28%, electricity from PV: 19% and heat from the environment for heat pumps: 5%) ([www.brdo.ssrs.si](http://www.brdo.ssrs.si)) (Source: SSRS).*



*Figure 2. Airtightness quality control – Blower door tests for apartments and for the entire building were done in several stages during the construction of the building F3 Brdo, Ljubljana – a NZEB demonstration project of the Housing Fund of the Republic of Slovenia (2016) (Source: GI ZRMK, Photo: Andraž Rakušček).*

NZEB national plan intermediate targets - new buildings (m <sup>2</sup> )	Target 2015	Target 2018	Target 2020	Target* 2014-2018	Target* 2014-2020	Achieved** 2014-2017
	A <sub>u</sub> (m <sup>2</sup> )	A <sub>u</sub> (m <sup>2</sup> )	A <sub>u</sub> (m <sup>2</sup> )	No. of NZEBs (-)	No. of NZEBs (-)	No. of NZEBs (-)
<b>Single-family houses</b>	76,850		267,500		6,300	463
<b>Multi-family houses</b>	9,753		73,650		167	5
<b>Public buildings</b>	53,320	84,126		224		30
<b>Other non-residential buildings</b>	50,030	115,970		189		no data
* Estimation						
** The actually achieved number of new NZEB is based on the data of Eco Fund on subsidised investments and on the data from NZEB pilot projects.						

*Table 1. Intermediate targets for new early NZEB as given in the Slovenian national plan for NZEB (2015) versus actually constructed NZEB by September 2017.*

#### **2.1.iv. Requirements for systems and / or building components for new buildings**

Current minimum requirements for systems and building components are defined in PURES 2010 regulations, with the revision of the regulation planned for publication by mid-2018.

The study on PURES revisions (2015/2016) recommended complementing the minimum efficiency requirements of technical building systems with specific values for: space heaters, combination heaters, packages of space heaters, temperature controls, solar devices and packages of combination heaters, as well as water heaters, hot water storage tanks and packages of water heaters and solar devices based on the requirements of the Eco design Directive and delegated regulations No 811/2013 and No 812/2013.

Based on the cost-optimal study, more stringent minimum requirements were proposed for building components (Table 2). However, the designers should optimise the U-values of the envelope elements in order to meet the design specific transmission heat transfer coefficient ( $H_T'$ ) below the minimum value, as presented in Figure 3, and to comply with energy performance-based minimum requirements. Linear thermal bridges should be kept below  $\psi_e = 0.2 \text{ W/(mK)}$ .

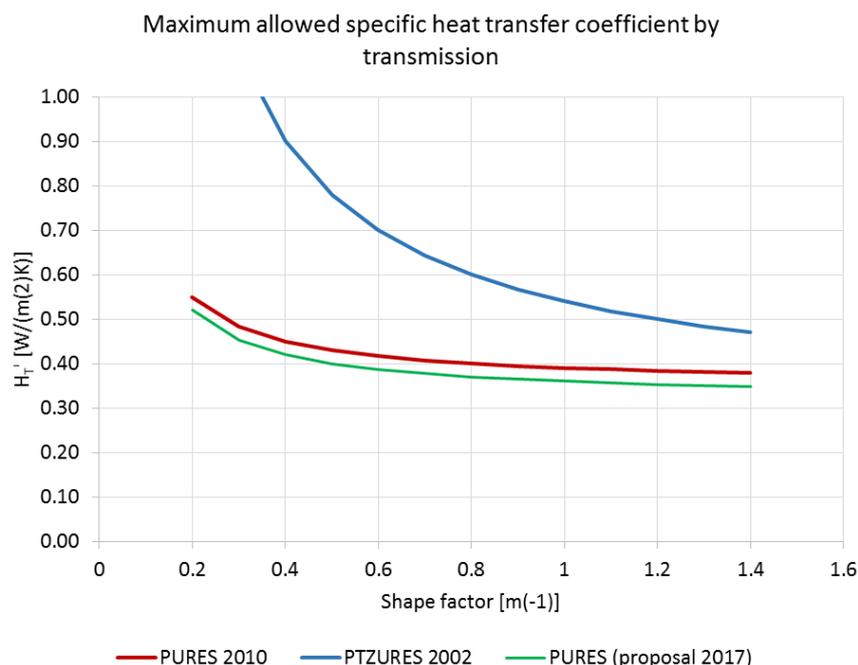


Figure 3. Maximum allowed specific heat transfer coefficient by transmission, development of regulation from 2002 to 2010 and proposal in compliance with cost-optimal study.

Minimum requirements for U-value of the envelope	Status 2017 (as in current PURES 2010)	Proposed new U-values max. (NZEB)
walls	0.28 W/m <sup>2</sup> .K	0.20 W/m <sup>2</sup> .K
floors between flats	0.90 W/m <sup>2</sup> .K	0.90 W/m <sup>2</sup> .K
flat roofs	0.20 W/m <sup>2</sup> .K	0.18 W/m <sup>2</sup> .K
windows	1.3 W/m <sup>2</sup> .K	1.0 W/m <sup>2</sup> .K

Table 2. Minimum requirements for the elements of the building envelope; current status (2017) and proposal for revised regulation expected in mid 2018.

## 2.II. ENERGY PERFORMANCE Requirements EXISTING BUILDINGS

In Slovenia, minimum requirements for existing buildings are given in the building codes PURES 2010 and do not differ from the requirements for new buildings in case of major renovations where a building permit is needed. If the works are classified as maintenance works, then only the minimum requirements for the particular element of the technical building system component are relevant.

In case of NZEB renovations, the minimum requirements for existing buildings expressed in primary energy are less stringent compared to those for new buildings: 95 / 90 / 65 kWh/m<sup>2</sup>.year for a NZEB renovation of a single-family house, a multi-family house and a non-residential building, respectively. These requirements are part of the national plan for NZEB and will be integrated into the revised PURES by mid 2018.

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

Minimum requirements for existing buildings are part of the Slovenian building codes since 2002. Renovation works for which a building permit is required must be done according to the building codes and following the requirements valid for new buildings.

PURES 2010 also transposed the EPBD as regards major renovations. Thus, the minimum requirements apply to all new buildings as well as major renovations, i.e., if at least 25% of the area of the building envelope is subject to renovation. In case of maintenance works on building envelopes, if a renovation (when a building permit is needed) is less than 25% of the thermal envelope area, or if buildings have a floor area smaller than 50 m<sup>2</sup>, only the minimum requirements for the U-values of the envelope must be considered (i.e., only an additional insulation layer will be mandatory). For major renovations of the heating system, and in case of maintenance and replacement works, minimum requirements for the systems, subsystems and elements are at the same level as those required for new buildings.

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

The strategy for the renovation of existing buildings to NZEB levels is defined in the Slovenian national plan for NZEB. Table 3 details the progress of this plan. About one third of the renovations included in the Long-term strategy for mobilising investment in the renovation<sup>8</sup> (2015) was foreseen to reach NZEB levels. Despite this, the progress in NZEB renovation is still quite slow. The NZEB renovation goes beyond deep renovations and is in many areas dependent on more sustainable energy supplies and on the deployment of smart energy networks. Deep renovation is thus the first step towards the goal and in many residential, public and non-residential buildings in Slovenia the process of step-by-step renovation has started (Figure 4, 5).

NZEB national plan intermediate targets- existing buildings (m <sup>2</sup> )	Target 2015 A <sub>u</sub> (m <sup>2</sup> )	Target 2018 A <sub>u</sub> (m <sup>2</sup> )	Target 2020 A <sub>u</sub> (m <sup>2</sup> )	Target* 2014-2018 No. of NZEBs (-)	Target* 2014-2020 No. of NZEBs (-)	Progress** 2014-2017 No. of NZEBs (-)
<b>Single-family houses</b>	241,000		2,395,000		14,655	deep renovation projects initiated
<b>Multi-family houses</b>	88,000		596,000		333	minor progress
<b>Public buildings</b>		123,000		94		projects initiated
<b>Other non-residential buildings</b>		190,000		127		no data
<b>Central government buildings</b>	2,000	20,000		11		projects initiated including demonstration
* Estimation						

Table 3. Intermediate targets for the NZEB renovation of existing buildings in Slovenia.

The operative measurable goals of the long-term strategy for the renovation of buildings by the year 2020 and 2030 comprise respectively:

- 3% of the annual renovation rate of buildings owned and occupied by the central government (i.e., between 15,000 m<sup>2</sup> and 25,000 m<sup>2</sup> per year, and 180,000 m<sup>2</sup> in total, in the 2014-2023 period);
- deep renovations of 1.8 million m<sup>2</sup> of public buildings within the 2014-2023 period;
- improved ratio (1:3) between invested public resources and initiated investments in energy renovations in the public sector;
- the implementation of five demonstration projects of energy renovations of different building types.

According to the long-term strategy, the renovation rate of residential buildings is planned to be 1.7% in the 2016-2030 period, 1.8% in the period of 2021-2030, 2.3% in the 2031-2040 period and 1.9% in the 2041-2050 period. Figures 4 and 5 present the renovation rate in single- and multi-family houses based on national subsidies allocated by Eco Fund; the buildings with envelope insulation installed present a solid base for future deep and SNES renovations. In multi-family building envelopes, insulation is a predominately implemented measure (apart from windows replacement that are done per individual apartment). The next steps towards deep or NZEB renovations are then frequently hindered due to economic barriers. In non-residential and public buildings in which the energy renovation was initiated, many projects are in the pipeline, and to facilitate the investment process, the update of the long-term strategy was amended with new financial instruments and offered in October 2017 for interministerial consultation.

The proposed update of the long-term strategy identified three critical fields in the energy renovation of existing buildings: quality management, the development of financial instruments and the problem of a moderately developed energy contracting market. The update suggested the following policies:

- developing quality assurance protocols for construction and building energy renovations with a building life-cycle perspective (building elements, systems, processes, and skilled workforce);
- updating PURES building codes with stricter minimum requirements;
- developing compensation rules for the allocation of subsidies for the energy renovations of private buildings (by now only public buildings benefitted from such special rules for heritage);
- developing holistic financial instruments which include technical support that would complement existing subsidies and other financial sources (e.g., European Fund for Strategic Investment- EFSI) and create a holistic support framework, including long-term loans and warranty schemes for risk-sharing, refinancing of investments (factoring, repurchase of green bonds), and capital injections for new Energy Service Companies (ESCOs);
- revising the Eco Fund program of subsidies for households, as a decrease in using the funds was recently noticed; implementing additional information, awareness, energy advisory and fuel poverty actions; upgrading programmes to finance partial renovations in public buildings (for buildings where deep renovations are not justified) and preparing a programme for financing deep renovations of public building projects with low returns;
- monitoring RES measures in building energy renovation projects with an “RES on-site” indicator.

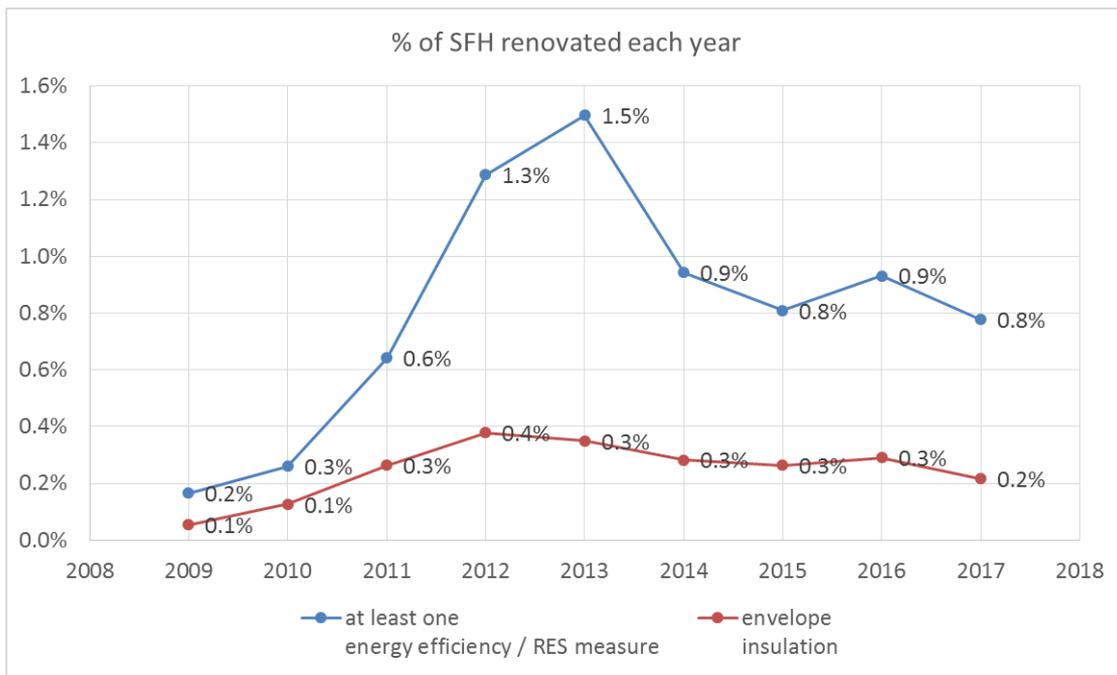


Figure 4. Annual share of single-family building renovations (based on Eco Fund subsidies).

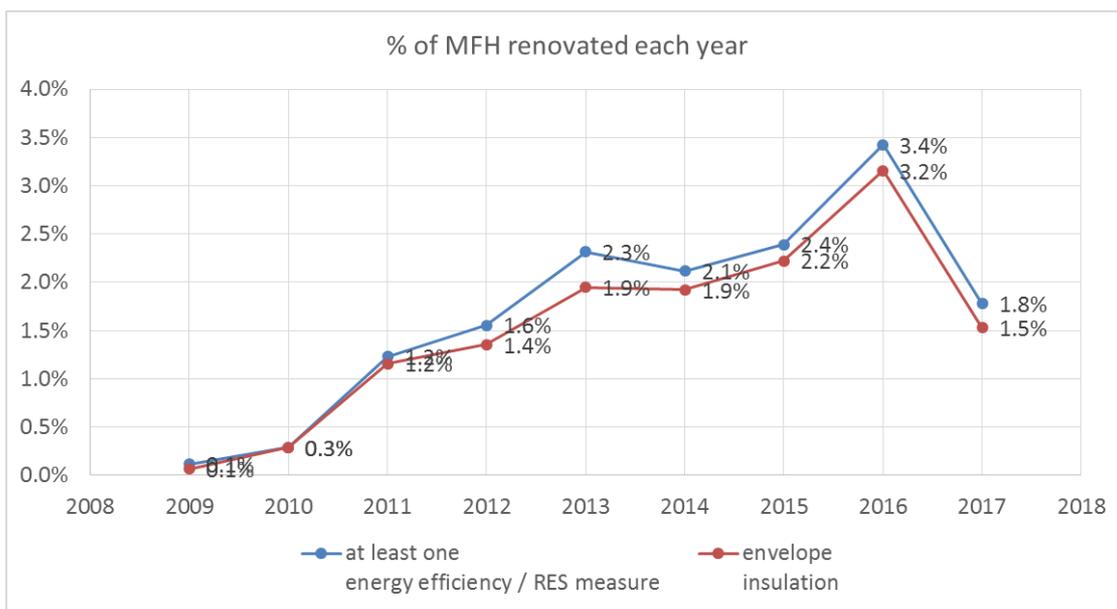


Figure 5. Annual share of multi-family building renovations (based on Eco Fund subsidies).

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

The introduction of system performance minimum requirements is being considered in the revision of the building codes PURES, planned for mid 2018. The amendment is related to the introduction of the new set of CEN EPBD standards.

Currently (in PURES 2010), system energy efficiency is achieved by selecting products that fulfil the energy efficiency requirements, with corresponding design and construction rules for sub-systems. The regulation has imposed system performance requirements via many rules on product and sub-system energy efficiency. The rules address heating, ventilation, cooling, AC and lighting sub-system and the energy efficiency of products.

#### ***2.II.iv. Encouragement of intelligent metering***

The plan in Slovenia is to replace up to 80% of the existing electricity meters with smart meters by the year 2023. Cohesion funding is available specifically for this process. Companies owning electricity networks are eligible for a 33% co-financing of the investment with a total available budget of 13.9 million € in the 2017-2022 period.

By the end of 2016, over 50% of meters had been replaced with intelligent metering; it is also estimated that between 65% and 70% of households already had intelligent meters installed. The Decree on measures and procedures for the introduction and interoperability of advanced electric power metering systems<sup>9</sup> (2015) supported the introduction of intelligent meters.

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

Financial resources for the renovation of public buildings, mitigating fuel poverty in households and developing demonstration projects are planned in the Operational Programme for the implementation of the European cohesion policy in the 2014-2020 period<sup>10</sup>. A strong focus is placed on mobilising private resources. A budget line in the operational programme is available to support the development of energy performance contracting, partly (115 million €) with grants and partly (50 million €) with financial instruments. In several Slovenian municipalities, ELENA technical assistance was supported by the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD), respectively. A number of municipal public buildings and buildings of the central government are subject to call for promoters or ESCOs. However, the ESCOs market in Slovenia is moderately developed (experiences are limited) and new domestic and foreign private investors are in demand. Low energy prices and much lower profitability of deep renovations compared to certain individual measures are a challenge for new financial instruments in revision of the long-term strategy.

The Eco Fund will further provide grants and soft loans for the renovation of existing residential buildings and to intensify awareness, information and energy advisory activities; new financial products are currently available as soft loans from commercial banks for renovating residential buildings. The energy renovation of existing buildings will rely to a great extent on the funds from the EIB, the funds of the Republic of Slovenia, private funds, and on the EFSI.

The website of the Ministry of Infrastructure<sup>11</sup> contains a list of the financing options currently available for building energy renovations in all sectors.

#### ***2.II.vi. Information campaigns / complementary policies***

Based on the Energy Act, the state-owned company BORZEN promotes energy efficiency in all sectors via the web portal "*Trajnostna energija*"<sup>12</sup>, with events, publications and television broadcasts on energy efficiency and RES.

Eco Fund manages ENSVET<sup>13</sup> energy advisory projects for buildings and households and partly for municipalities. The ENSVET network operates in municipal offices and on major events and fairs; it is free of charge for the end-user. The Eco Fund web portal gives an abundance of information on financing and technical details on the measures.

The participation of Slovenian partners in consortia of EU funded projects raises the general knowledge of important topics for EPBD implementation and often stimulates beneficiaries to become front-runners in building renovations and other projects. The building industry and the private sector contribute to the information by establishing energy technology exhibitions and training centres.

## **2.III. Energy performance certificate requirements**

The provisions for the EPC are given in the Energy Act for new and existing buildings as well as for public buildings. The last change in the Slovenian EPC system was imposed in 2014.

EPCs are completed by licenced independent experts and issued by authorised organisations. The EPC rating can be either calculated or metered. For new buildings and for all residential buildings (i.e., new and existing), only a calculated EPC rating is possible. An EPC may be issued for a building as a whole, for an individual part of the building or for an apartment. For non-residential buildings, either a metered or a calculated EPC rating can be given. A metered EPC rating is the first choice and is also simpler and cheaper, but in case of a lack of data, an independent expert may decide that for technical reasons a calculated EPC rating is needed.

An EPC is obligatory for new buildings where it is part of the documentation of the completed construction works. All existing buildings must have an EPC when sold or rented and by law, the building owner must show the EPC to the buyer/tenant before the contract is concluded. Display of the energy performance indicator is obligatory in advertisements; in all public buildings with more than 250 m<sup>2</sup> of floor area, the EPC must be displayed in a clearly visible place. The amended Energy Act (publication expected by the end of 2017) will define that the display of an EPC is also obligatory in buildings frequently visited by the public (i.e., commercial buildings like hotels, banks, shops, etc.).

The database of issued EPCs is maintained by the Ministry of Infrastructure. All EPCs are stored in an electronic registry and linked to the national real estate database. From the beginning of 2015, all issued EPCs are also publicly accessible via the national real estate registry at the Geodetic Administration of the Republic of Slovenia. In 2017 the beta version of the visualisation of building energy efficiency was being prepared based on linking the EPC database with GIS data.

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

On average, approximately 10,000 EPCs are issued per year in Slovenia. In total, the status of all EPCs registered in the state register by the end of 2016 was around 39,000 (39,211 by 20 January 2017; 45,317 by 10 October 2017).

Compared to the previous national report, the recent changes showed a tangible increase of EPCs in the residential sector in contrast to non-residential buildings, mainly due to more EPCs being issued for multi-family buildings.

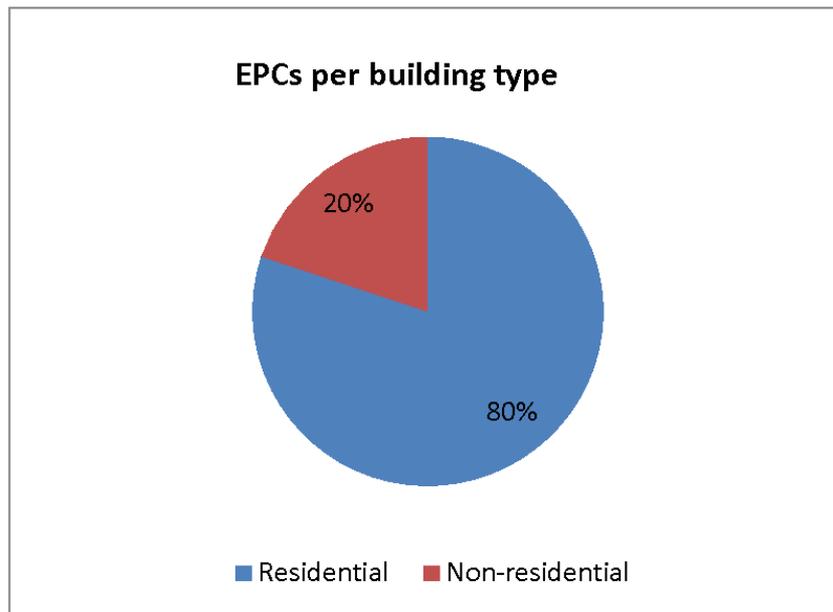


Figure 6. The structure of issued EPCs per building type in the 2013-2016 period.

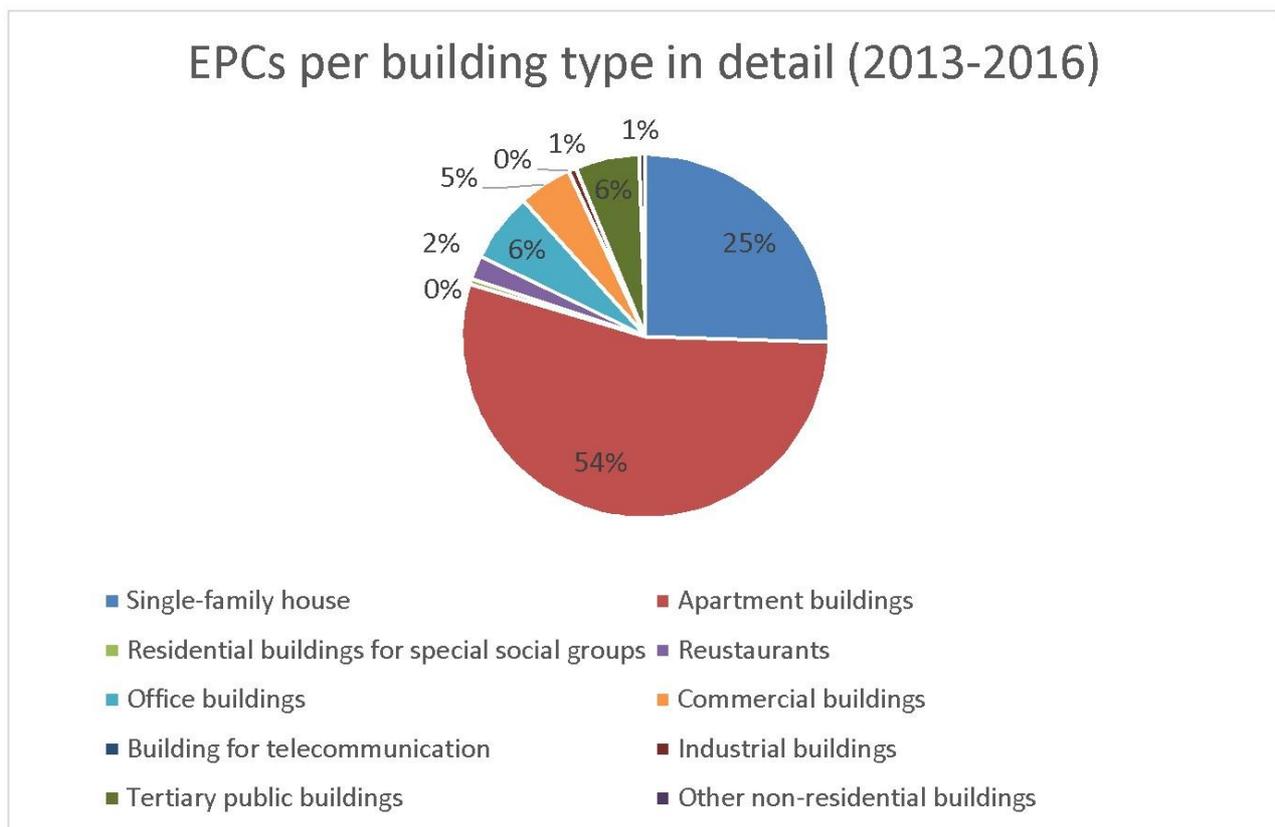


Figure 7. Share of EPCs per building type in detail, for the 2013-2016 period.

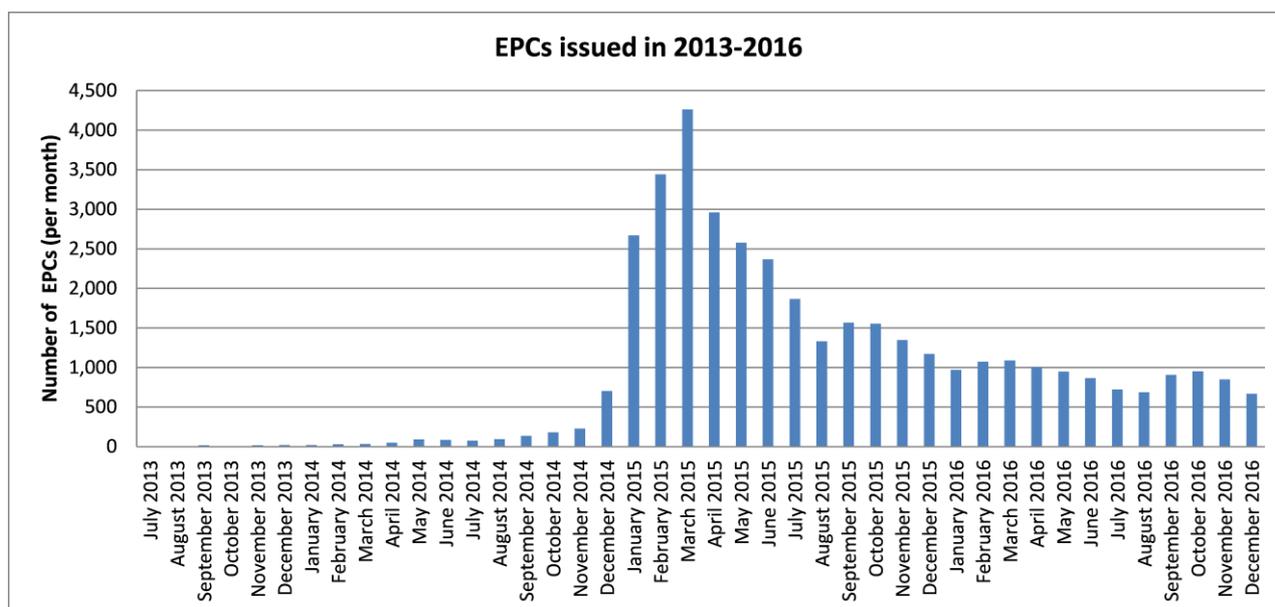


Figure 8. Number of EPCs issued per month by the end of 2016.

### 2.III.ii. Quality Assurance of EPCs

The control of technical quality is a responsibility of the Ministry of Infrastructure. First-level control is automatically performed by the EPC electronic registry, during the last step of the EPC entry. Validity and plausibility of data in an EPC are examined by validating the data against the EPC and other public real estate registers. If an EPC does not meet the check, it cannot be issued. Second-level control is performed by the Inspectorate of the Republic of Slovenia for the Ministry of the Environment and Spatial Planning. If a quality problem of an EPC is claimed, the inspectorate checks the status and the issued EPC and then declares its decision regarding the quality with a decision and a penalty, if relevant. The penalty depends on the mistake, i.e., if necessary, one must correct the EPC as well as issue and store a new one in the register. Currently, statistical data on issued corrected EPCs are not yet available.

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

The public building stock represents 11% (around 600,000) of the entire number of buildings. Public and large buildings visited by the public represent 28% of all EPCs issued for non-residential buildings in Slovenia in the 2013-2016 period.

Most public and large buildings visited by the public have an EPC, primarily due to the obligation defined in the Energy Act, and secondly due to energy renovation planning processes. An energy audit is a precondition for financing the investment, and for each building for which an energy audit is performed there is also an issued EPC. The progress is good due to a number of financing possibilities. In addition, the 3% annual energy renovation rate of buildings owned and used by the central government contributed to a significant increase of the number of EPCs within 2 years, as all the buildings on this list obtained an EPC.

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

In Slovenia, advertising with the inclusion of the EPC energy performance indicator is obligatory when selling and/or renting the building or the building unit. The control is the responsibility of the market inspectorate. Various intensive additional activities are ongoing in this field.

The Ministry of Infrastructure is testing the application for the electronic comparison of the database of the real estate transaction, the rental database and an EPC database.

The Energy Act EZ-1 defined the penalties for non-compliance with EPC rules. On 24 February 2014, penalties of between 1,000 € and 10,000 € were introduced for public building owners/users if an EPC is not displayed. A fine is also set for the person responsible for the task (from 100 € to 500 €). The penalties (250 €) for building owners advertising the selling/renting of the building without displaying the energy indicators from an EPC were put in place as of 1 January 2015, while as of 24 February 2015 the penalty for selling/renting a building without an EPC is 300 €.

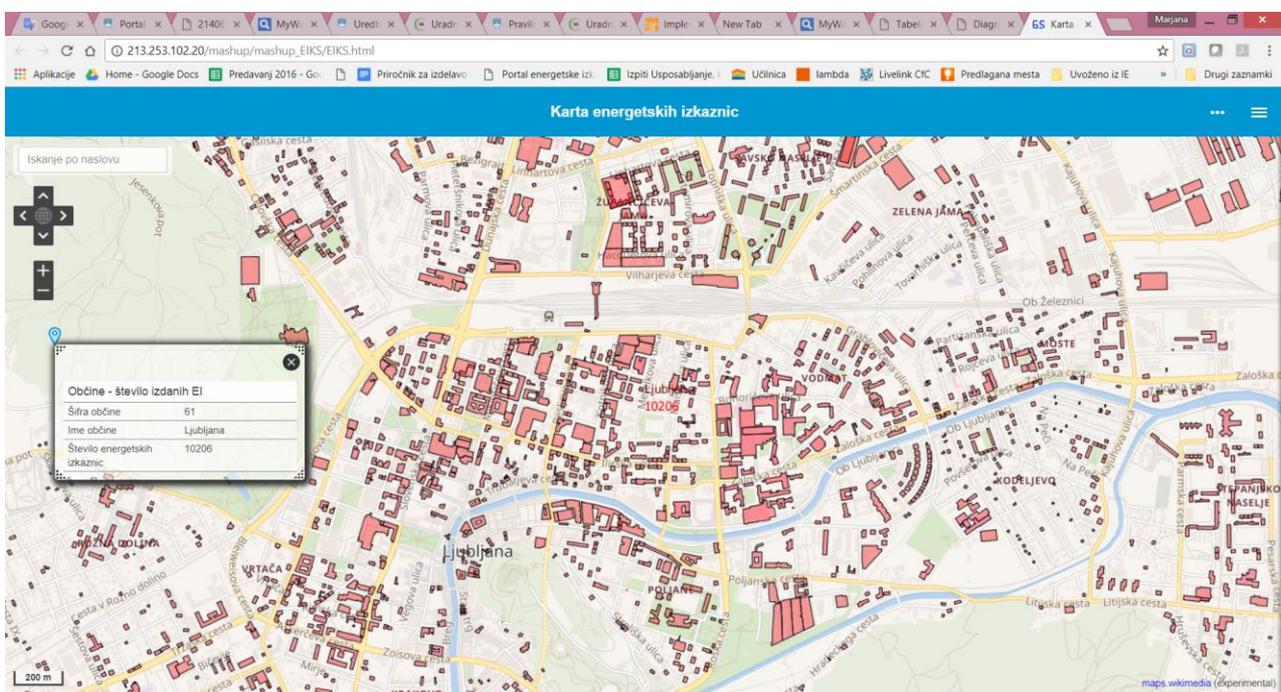


Figure 9. Cross-linking of public databases. The map shows the EPCs issued per municipality and visualises the EPC e-register on a GIS map.

## 2.IV. Inspection requirements - heating systems, air conditioning

Slovenia has a combined system which includes inspections and alternative measures in the inspection of heating systems. A mandatory inspection of the installations of heat generators with a power above 600 kW is required and undertaken by qualified independent experts (in 2015 the new regulation on this topic has successfully passed public consultation; however, the adoption is still pending due to expected new thresholds in the new EPBD).

For nominal heat output of the generators between 20 kW and 600 kW, the use of alternative measures is in place under the existing scheme of chimney sweep inspections.

Inspections are required for AC systems with more than 12 kW nominal power. The methodology is defined in the regulation for regular inspections of AC systems (adopted in 2008).

#### ***2.IV.i. Report on equivalence of model A and B for Heating Systems***

The described system is fully in operation. There is a system of licenced independent experts for the inspection of AC systems in place; the regulation of training and accreditation of experts was revised in 2016.

#### ***2.IV.ii. Progress and current status on heating systems***

A number of activities from alternative measures are entirely implemented. This part is connected primarily to smaller heating devices inspected by chimney sweepers.

#### ***2.IV.iii. Progress and current status on AC systems***

The inspections of AC systems are fully in use. Inspections are performed by licenced independent experts, who undergo training and exams and have been issued a licence which is valid for a period of 5 years. All AC inspection reports are registered by the Ministry of Infrastructure. An e-register for reports on the inspection of AC systems is in preparation.

The inspection of AC systems is promoted through different channels; in the future, information activities will be intensified.

#### ***2.IV.iv. Enforcement and impact assessment of inspections***

##### **Enforcement and penalties**

Penalties are set by Article 493 of the Energy Act. A penalty of 300 € is foreseen when the owner of a building or building unit fails to ensure regular inspection of the AC systems of buildings or parts of buildings in which AC systems of a nominal output capacity exceeding 12kW are installed.

##### **Quality control of inspection reports**

The quality control is done in line with Article 347 and Article 461 of the Energy Act.

The first formal quality controls of AC inspection reports were done in 2016.

##### **Impact assessment. Costs and benefits**

Impact assessment is not yet available at this stage.

### 3. A success story in EPBD implementation

Based on the Long-term strategy for energy renovations of existing buildings (2015), Slovenia developed holistic policies for specific building types. This success story is about a set of policies for multi-family buildings. There are around 25,000 old multi-family buildings in Slovenia, built mostly between 1960 and 1980 and privatised in the 1990s. The Residential Act imposed building management as an obligatory service in each multi-family building. A new profile of companies for building (facility) management was developed which manages the proper operation, maintenance, repair and renovation of existing multi-family buildings on behalf of the building owners. The owners are obliged to contribute at least a minimum amount (0.2 to 0.3 EUR/m<sup>2</sup>) or more to a “reserve fund” of the buildings, and the budget can only be used for regular maintenance, urgent repair and for renovations, including investments in energy renovations, and to repay the loan for the works. A precondition is an accepted maintenance plan, where a 50% consensus is required to accept such a plan and to use the reserve fund, respectively. On the other hand, for energy renovations, a 50% consensus (elapsed economic lifetime of the element) to a 75% consensus (investment before the end of economic life) is needed.

The most important barriers hindering deep energy renovations of multi-family buildings are: the lack of consensus (50%, 75%) for renovation investment (100% if a building permit is needed); the lack of money and/or fuel poverty; the 100% consensus needed to take a loan; the credit worthiness of all building owners – necessary for the approval of the loan; previously completed single measures that prolong the payback of later planned energy efficiency measures; insufficient information on technical solutions and financing options; insufficient design and planning of the works before commencement; the unreliable control of works; a low level of trust in contractors, who are unfortunately not always adequately skilled; and a lack of monitoring and optimisation after the completion of works.

To break through these barriers and allow for deep energy renovations of multi-family buildings to take place, the following package of policies was put into action in 2016:

information activities for flat owners (web portals, radio and television broadcasts, information events at fairs and in shops);

- free advice for households at ENSVET energy advisory offices;
- guidelines for renovating heritage buildings;
- training of over 200 building managers (in 2 full-day training sessions) for facilitating deep renovations of multi-family buildings;
- progressive subsidies made available by Eco fund for common investments:
  - A. thermal insulation of the envelope;
  - B. thermal insulation of roof;
  - C. optimisation of the heating system;
  - D. deep renovation of a multi-family building.

A 20% subsidy is allocated in case of a single measure, 30% for 2 measures -- one of them being optimising the heating system, and 40% for deep renovations, i.e., thermal insulation of outer wall, roof or ceiling and optimising a heating system. The precondition (and eligibility for a 50% subsidy) is providing detailed design documentation for the envelope insulation as well as the regular quality control of the renovation works by a designer and a chartered engineer. The following is also considered/provided:

- a limited time frame of 24 months to complete the investment, as the aim is to achieve deep renovations rather than step by step;

- exceptional financial support made available to low-income homeowners (upon approval of the office for social work), i.e., a 100% subsidy for their share of the common energy efficiency investment in a multi-family house;
- loans for common renovation works in multi-family buildings made available at Eco Fund and at commercial banks via SID bank<sup>14</sup>, from EIB funds or from own bank fund;
- new financial instruments offered by commercial banks – “factoring”, in which the bank buys the claim from the contractor that completed the renovation and accepts monthly payments into the reserve fund for the repayment of debt.

## 4. Conclusions, future plans

The implementation of the EPBD has been a complex process for Slovenia. Certain parts of the requirements, e.g., energy performance certification and EPBD-based building codes, were successfully implemented and are already well accepted by professionals and the general public; regarding other elements, there is still progress to be made.

Further plans concern optimising certain parts in the regulation, including:

- upgrading the energy performance calculation methodology in accordance with the new CEN EPBD standards;
- developing a new national calculation tool that adheres to new CEN EPBD standards;
- introducing energy indicators for NZEB;
- transposing NZEB minimum requirements into the building code;
- enabling consideration of NZEB in interaction with the NZEB district energy supply;
- elaborating on EPCs for complex non-residential buildings as well as for the inspection of heating and AC systems;
- finding a balance between more effective implementation procedures and a reasonable application of penalties in cases of non-compliance;
- creating a high level of acceptance of EPBD obligations.

## Endnotes

1. Energy Act (Uradni list RS, št. 17/14 in 81/15); [www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO6665](http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO6665)
2. Rules on the training, accreditation and register of accredited independent experts for regular inspection of AC systems (Uradni list RS, št. [18/16](#)); [www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV12525](http://www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV12525)
3. The Slovenian Environment Public Fund, a subsidy system that requires blower door tests [www.ekosklad.si/information-in-english](http://www.ekosklad.si/information-in-english)
4. Rules on the efficient use of energy in buildings with technical guidelines (Uradni list RS, št. [52/10](#)); [www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV10043](http://www.pisrs.si/Pis.web/pregledPredpisa?id=PRAV10043)
5. The decree on green public procurement (Uradni list RS, št. [102/11](#), [18/12](#), [24/12](#), [64/12](#), [2/13](#), [89/14](#) in [91/15](#) – ZJN-3); [www.pisrs.si/Pis.web/pregledPredpisa?id=URED5194](http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED5194)
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8. [www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/dolgorocna-strategija-za-spodbujanje-nalozb-energetske-prenove-stavb/](http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/dolgorocna-strategija-za-spodbujanje-nalozb-energetske-prenove-stavb/)
9. The decree on measures and procedures for the introduction and interoperability of advanced electric power metering systems (Uradni list RS, št. [79/15](#)); [www.pisrs.si/Pis.web/pregledPredpisa?id=URED6907](http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED6907)
10. Operational Programme for the implementation of the European cohesion policy for the 2014-2020 period; [www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/op\\_ang\\_final\\_web.pdf](http://www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/op_ang_final_web.pdf)
11. [www.energetika-portal.si/javne-objave/](http://www.energetika-portal.si/javne-objave/)
12. [www.borzen.si/sl/Domov/menu1/Trajnostna-energija/Portal-Trajnostna-energija](http://www.borzen.si/sl/Domov/menu1/Trajnostna-energija/Portal-Trajnostna-energija)
13. [www.ekosklad.si/fizicne-osebe/en-svet](http://www.ekosklad.si/fizicne-osebe/en-svet)
14. [www.sid.si](http://www.sid.si)



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