

National plan for increasing the number of nearly zero- energy buildings in Slovenia



National plan for increasing the number of nearly zero-energy buildings in Slovenia

By: Sven Schimschar, Nesen Surmeli, Andreas Hermelink

Date: 15 May 2013

Project number: BUIDE13616

© Ecofys 2013 by order of: European Commission

Table of contents

| | | |
|----------|--|-----------|
| 1 | Starting point | 4 |
| 2 | Application of the definition of nearly zero-energy buildings | 8 |
| 3 | Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings | 11 |
| 4 | Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings | 14 |
| 5 | Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020 | 17 |
| 6 | Policies and measures for the promotion of all new buildings occupied and owned by public authorities being nearly zero-energy buildings after 31 December 2018 | 19 |
| 7 | Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings | 20 |
| 8 | Additional Information | 22 |
| 9 | Possible improvements | 23 |
| | Annex- Definition of nZEB | 24 |

1 Starting point

Please give a short overview of your national building stock. Describe the most important characteristics and emerging needs. Additionally, illustrate the chronological development of national requirements on the energy performance of buildings (for an example, see guidance document)

Building stock characteristics

Slovenian building stock consists of almost 67 million m² residential floor area and more than 23 million m² of non-residential floor area. Data on buildings are maintained and updated in national databases (e.g. Real Estate Register) that are under control of Geodetic Administration of the Republic of Slovenia. Databases consist data as well on year of building's construction, as well on its possible renovation of thermal envelope's elements. From the latter the most emerging needs for renovation can be seen.

The dataset of buildings is assembled from the following main categories:

- (a) Single family houses
- (b) Apartment blocks
- (c) Offices
- (d) Educational buildings
- (e) Hospitals
- (f) Hotels and restaurants
- (g) Sports facilities
- (h) Wholesale and retail trade services buildings
- (i) Other types of energy-consuming buildings

The residential stock is the biggest segment with floor space of 74% of the building stock (Figure 1). Within the residential sector, different types of single family houses (e.g. detached, semi-detached and terraced houses) and apartment blocks are found. Apartment blocks may accommodate several households typically ranging from 2-15 units or in some cases holding more than 20-30 units (e.g. social housing units or high rise residential buildings).

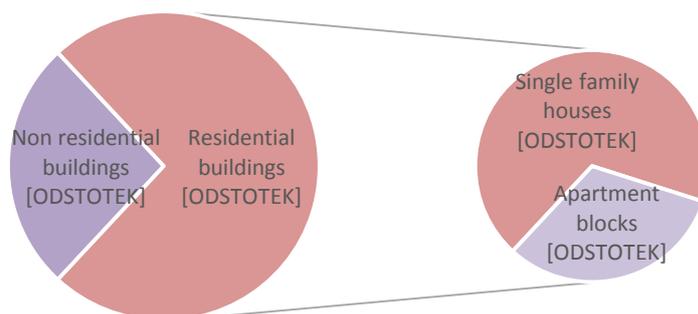


Figure 1: Share of floor space area in Slovenian building stock

| Building type (age of construction) | number of buildings | number of apartments | floor area [1.000 m2] |
|---|---------------------|----------------------|-----------------------|
| Single-family houses | | | |
| up to 1945 | 118323 | 118323 | 9348 |
| 1946 - 1970 | 96378 | 96378 | 8857 |
| 1971 - 1980 | 70128 | 70128 | 7165 |
| 1981 - 2002 | 132176 | 132176 | 13387 |
| 2003 - 2008 | 21395 | 21395 | 2466 |
| from 2009 | 14055 | 14055 | 1658 |
| Multi-family houses | | | |
| Two-apartment buildings | | | |
| up to 1945 | 8644 | 16665 | 1214 |
| 1946 - 1970 | 8215 | 15756 | 1186 |
| 1971 - 1980 | 5866 | 11242 | 925 |
| 1981 - 2002 | 4835 | 9157 | 790 |
| 2003 - 2008 | 679 | 1251 | 109 |
| from 2009 | 444 | 879 | 61 |
| Three- or more apartment buildings | | | |
| up to 1945 | 8101 | 46732 | 2685 |
| 1946 - 1970 | 7009 | 90470 | 4527 |
| 1971 - 1980 | 3559 | 78075 | 4017 |
| 1981 - 2002 | 4071 | 70932 | 3760 |
| 2003 - 2008 | 1458 | 22102 | 1302 |
| from 2009 | 673 | 11775 | 710 |

Table 1: Size and age structure of residential building stock

The diversity in terms of typology within the non-residential sector is vast. Compared to the residential sector, this sector is more complex and heterogeneous. It includes types such as offices, shops, hospitals, hotels, restaurants, supermarkets, schools, universities and sports centres while in some cases multiple functions exist in the same building. The most common representative buildings are schools and office buildings (Figure 2).

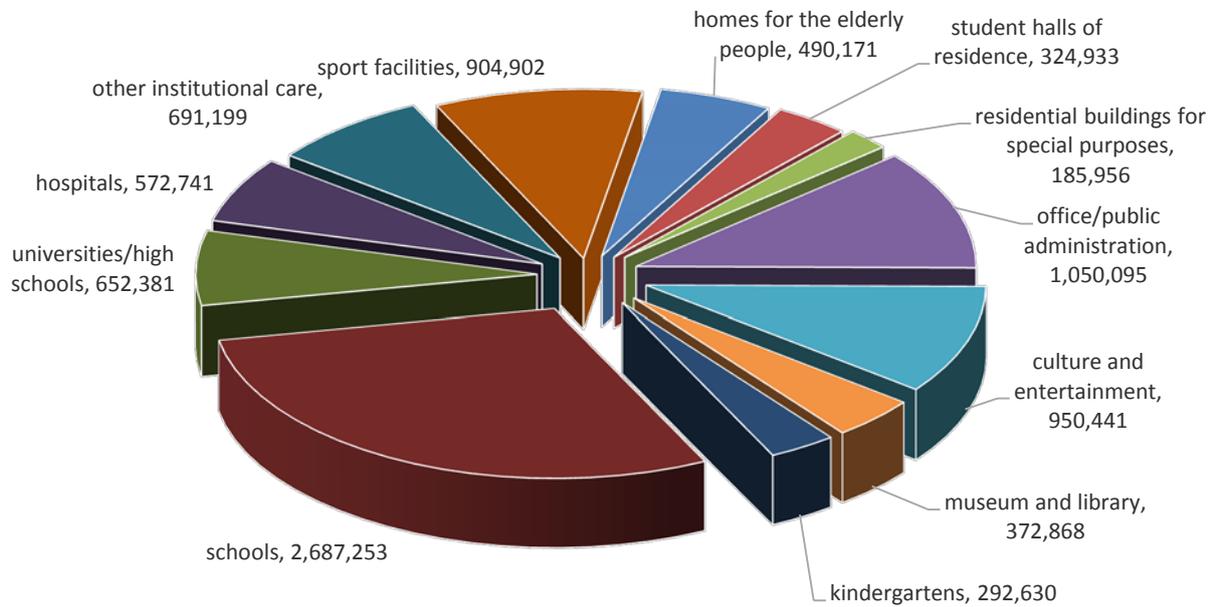


Figure 2: Structure of non-residential building stock (building type; total floor area (m(2)))

Development of national requirements on the energy performance of the building

Since the first thermal regulation became law in 1970, several strenghtenings and changes of the new legal requirements for new buildings took place. The latest regulation PURES 2010 came into force in 2010. As a next step towards nearly zero-energy buildings, it includes a strenghtening of the requirements for new buildings already in 2015.

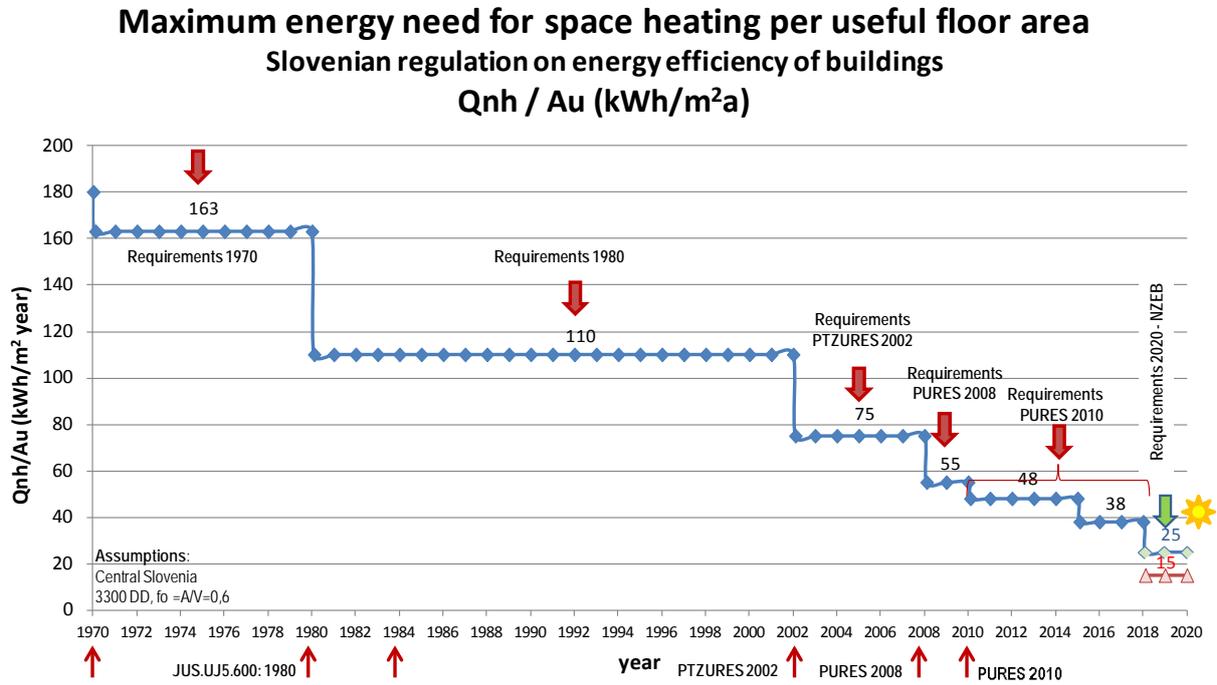


Figure 3: Overview of the tightening prescribed minimum requirements for the energy performance of buildings in Slovenia and increasing complexity of minimum requirements

2 Application of the definition of nearly zero-energy buildings

Please indicate how a nearly zero-energy building is defined within national context and explain underlying assumptions and factors that provide the rationale for the chosen definition.

The technical definition of nZEB in Slovenia was defined in the National plan for nZEB (in public consultation since Oct. 2014).

The definition is based on strengthened minimum requirements valid for all new buildings, major renovation and maintenance measures imposed in technical regulation PURES 2010, with validity from 31 December 2014 on.

In addition to that the definition of nZEB prescribed:

- very low amount of energy required in terms of heating needs
- maximum allowed values of primary energy indicator in kWh/m²yr
- very significant extent of renewable energy.

In the technical minimum requirements for nearly zero-energy building strengthening of minimum requirements regarding the maximum allowed need for heating, cooling or air conditioning, hot water and lighting in the building are foreseen. As well as an increase in headline share of renewable energy in total energy consumption for the operation of the building.

Very low amount of energy required

If the maximum permitted energy need for heating of the building in the event of a family house with a shape factor (envelope / volume) of 0.6 according to the requirements PURES 2010 (valid for all new buildings and major renovation) by the end of 2014 is limited to 48 kWh/m²a and furthermore, the restriction starting in 2015 is going to reduce the maximum value to 38 kWh/m²a.

With the introduction of minimum requirements for nearly zero-energy building of the maximum energy need for heating is reduced to:

- 25 kWh/m²a, with the limitation of primary energy can be met only with a significantly higher actual share of renewable energy (expected to increase from 25 % to 50 %) in the total final energy consumption for the operation of the systems in the building;

The nearly zero energy buildings derive from the study of cost-optimal minimum requirements, where the following maximum allowable values for primary energy are provided:

| Type of building | Maximum allowed value of primary energy (kWh/m ² a) | |
|---------------------------|--|-------------------|
| | New Build | Major renovations |
| Single-family building | 85 | 105 |
| Multi-family building | 80 | 90 |
| Non-residential building* | 55 | 80 |

* based on analysis of cost-optimal level of office buildings, as most targeted group of non-residential buildings

In non-residential buildings only the EPBD Annex 1 related energy use is considered (appliances and technology is not included).

The appropriate proportion of renewable energy sources is produced from renewable sources on site (eg. technical systems produced energy from the sun, ambient heat, wind ...) and renewable energy input part of the cross-border area assessment (eg. woody biomass, renewable part energy district heating or cooling "in the vicinity",...) Part of the renewable electricity are ignored from the grid when we talking about share of renewable sources for nZEB.

The value of primary energy for nearly zero-energy buildings can be achieved by increasing the share of local renewable energy sources with the following techniques described below.

District heating systems with biomass as fuel, the systems for the conversion of energy in controlled emissions mainly in urban and geographically unfavourable densely populated areas are as effectively reduce primary energy use while raising the level of local energy self-sufficiency in comparison with other energy products. Systems or cogeneration, polygeneration are best suited for transformation of biomass (potentially waste) into thermal energy with high efficiency of local energy resources while increasing the share of renewables in the national electricity system without burdening the environment with emissions of particulate matter and other emissions, and the more local influences such as nitrogen and sulfur oxides. Exceptionally, in the suburban and less populated areas biomass boilers represent a significant contribution to the reduction of primary energy consumption.

Irrespective of the location are in reducing primary energy consumption for heating nearly zero-energy buildings suitable heat pumps that use a high share of RES in its operations. Thus, coefficient of performance (COP), as the share of renewables in electricity production in the national electricity sector have a significant impact on the share of renewable energy sources used by the heat pump in its operations. In 2012, the share of RES in Slovenia for electricity production was 31.4 %, which means that the heat pump with a COP of 3.5 exploits 80.4 % renewables and 19.6 % of non-renewable sources of energy for their operation. This represents approximately 35 % less primary energy for the same volume of heat than comparable systems on oil or gas. Achieving the objective in 2020 with 39.3 % share of RES in the national electricity system will mean that the same heat pump used 82.7 % of its energy from renewable sources for its operation.

Some other systems that are more dependent on natural variations in weather conditions (solar panels, solar power) are in the case of own use in nearly zero-energy buildings also suitable for improving the balance of primary energy, their value lies mainly in the economic and technical accessibility of individuals to technologies that can contribute to nature-friendly life-style.

Upon final approval of the minimum requirements for nearly zero-energy building is essential to ensure the consistency of standard profiles use buildings with the emerging new generation of CEN EPBD standards, reexamine the areas of energy involved in determining energy indicators (in Slovenia in residential buildings also consider the use of energy for lighting), to examine how the computation renewable sources produced on the building / with her / near the building. In approving

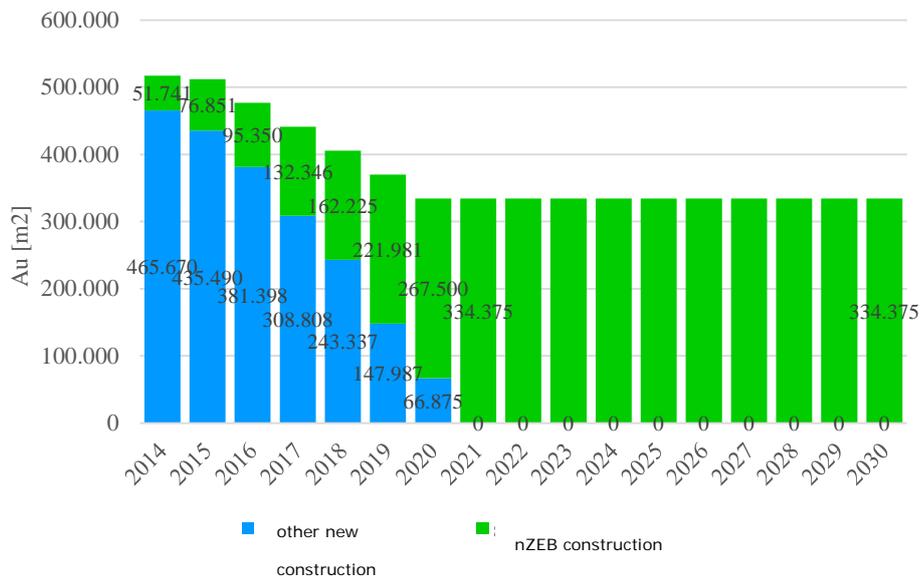
the technical definition of nearly zero energy buildings is also important to revise the conversion factors for the calculation of primary energy.

3 Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings

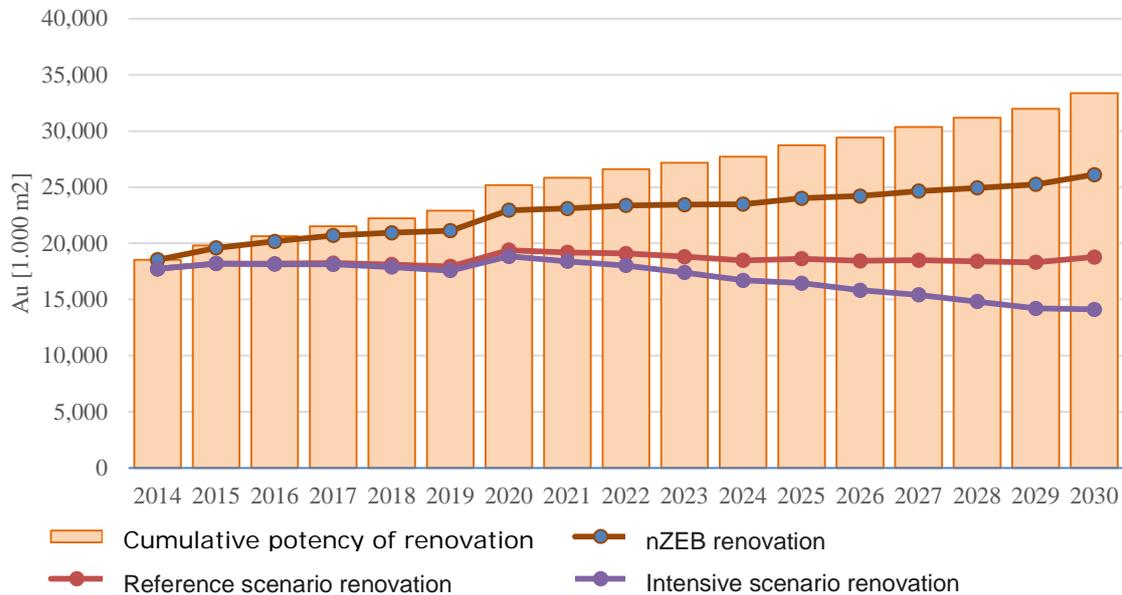
Please report the 2015 targets ensuring that by 31 December 2020 all new buildings are nearly zero-energy buildings. Also explain how they relate to and help to ensure that all new buildings are nearly zero-energy buildings by 31 December 2020.

What are the qualitative and quantitative 2015 targets for all new buildings?

At lower chart is projection of construction of new single-family buildings with an assessment of the potential for phasing the construction of nearly zero-energy-dwelling buildings.



At lower chart is potential for major renovation of single family houses with the targeted share of nZEB renovation.



3.1.1 Qualitative 2015 targets: Interim energy related requirements for new residential and non-residential buildings

Energy related requirements for new residential and non-residential buildings are:

- Requirements on fraction of renewable energies: 25% for all buildings, 50% for nZEB
- Requirements on useful energy demand: nZEB heating energy demand $Q_{h,nd} < 25 \text{ kWh/m}^2\text{yr}$
- Requirements on primary energy demand: new min. requirements are in Rules on efficient use of energy in buildings with a technical guideline (Reg. Number 52/2010), valid since 31 Dec. 2014.

3.1.2 Quantitative 2015 targets: Share of nZEB according to official nZEB definition on all newly constructed buildings (define reference parameter e.g. number of buildings, floor area, volume etc.):

At lower table are quantitative 2015 targets.

| nZEB 2015 targets | Number of buildings | floor area |
|---------------------------------|---------------------|------------|
| Single-family houses | 480 | 76.850 |
| Apartment blocks | 8 | 9.753 |
| Public buildings | 41 | 53.320 |
| Other non residential buildings | 26 | 50.030 |

Miscellaneous:

From your point of view, how close is your country at the moment in achieving this target? In case there is no target defined yet, please indicate when it is expected to have such a target.

Target are realistic.

4 Intermediate targets for improving the energy performance of new buildings in order to ensure that by 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings

Please report here the 2015 targets ensuring that by 31 December 2018 all new public buildings are nearly zero-energy buildings. Also explain how they relate to and help to achieve that by 31 December 2018, all new public buildings are nearly zero-energy buildings

What are the qualitative and quantitative 2015 targets for all new buildings occupied and owned by public authorities?

At lower chart is projection construction of new public buildings to assess the potential for gradual introduction of nearly zero-energy new public buildings.



4.1.1 Qualitative 2015 targets: Interim energy related requirements for new public buildings

Energy related requirements for new residential and non-residential buildings are:

- Requirements on fraction of renewable energies: 25% for all buildings, 50% for nZEB
- Requirements on useful energy demand: nZEB heating energy demand $Q_{h,nd} < 25 \text{ kWh/m}^2\text{yr}$
- Requirements on primary energy demand: new min. requirements are in Rules on efficient use of energy in buildings with a technical guideline (Reg. Number 52/2010), valid since 31 Dec. 2014.

4.1.2 Quantitative 2015 targets: Share of public nZEB according to official nZEB definition on all newly constructed public buildings (define reference parameter e.g. number of buildings, floor area, volume etc.):

Lower tables summarize the interim targets for 2015 in the field of nearly zero-energy (nZEB) new buildings and renovations to the full introduction of the provisions of Article 330 of the Energy Act EZ-first (Reg.no. 17/14)

Intermediate targets new construction nearly zero-energy buildings

| Au nZEB intermediate goals for new buildings | | 2014 | 2015 | 2018 | 2020 |
|---|----|-------------|-------------|-------------|-------------|
| Single family buildings | m2 | 51.740 | 76.850 | | 267.500 |
| Multi family buildings | m2 | 6.440 | 9.753 | | 73,650 |
| Public buildings | m2 | 30.470 | 53.320 | 84.126 | |
| Other non residential buildings | m2 | 20.010 | 50.030 | 115.970 | |

The intermediate objectives of nearly zero-energy renovation of buildings in the residential, non-residential including the public sector

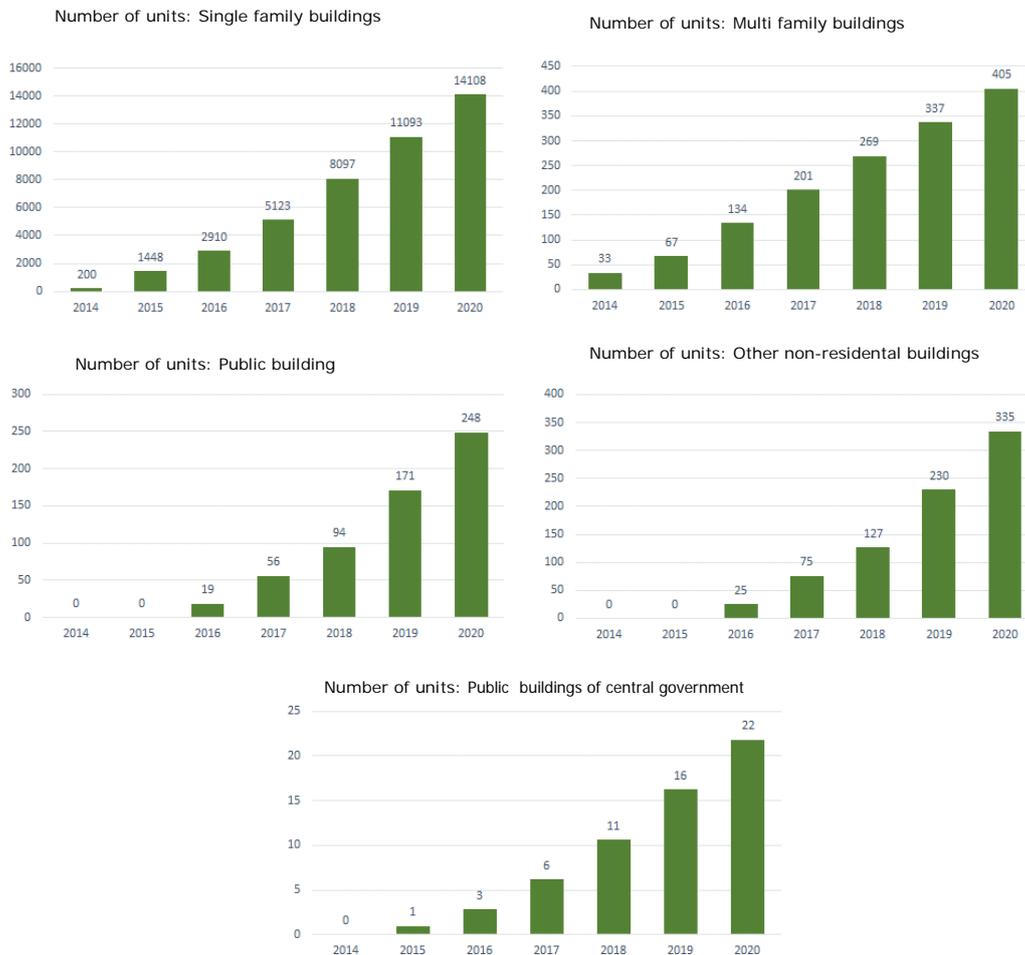
| Au nZEB intermediate objectives of a full renovation | | 2014 | 2015 | 2018 | 2020 |
|---|----|-------------|-------------|-------------|-------------|
| Single family buildings | m2 | | 231.680 | | 2.257.000 |
| Multi family buildings | m2 | 53.350 | 107.000 | | 649.000 |
| Public buildings | m2 | | | 123.000 | |
| Other non residential buildings | m2 | | | 190.000 | |
| Public buildings of central government (3% po EED) | m2 | | 2.000 | 20.000 | |

Miscellaneous:

From your point of view, how close is your country at the moment in achieving this target? In case there is no target defined yet, please indicate when it is expected to have such a target.

Targets are realistic.

At lower charts are rough estimation of the number of buildings (projects) planned for early nearly zero-energy new buildings or for early near-zero energy renovation of public buildings



5 Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020

| |
|---|
| 5.1.1 Residential buildings |
| <p>5.1.2 Relevant regulations Energy law (Reg. no. 17/14), Rules on efficient use of energy in buildings (Reg. no. 52/10), Action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf)</p> |
| <p>5.1.3 Relevant economic incentives and financing instruments Defined in Slovenian NEEAP 2020 and in Action plan for nearly zero energy buildings (under reception) Implemented through Eco fund in Slovenia.</p> |
| <p>5.1.4 Energy performance certificates' use and layout in relation to nZEB standard Current EPC bring the information on energy needs, primary energy and share of RES.</p> |
| <p>5.1.5 Supervision (energy advice and audits) Building inspectors control the implementation of requirements in technical regulation PURES 2010. National energy advisory network provides over 6000 advise per year also on nZEB.</p> |
| <p>5.1.6 Information (tools) National energy advisory network provides over 6000 advise per year also on nZEB. Web sites with info on subsidies available at Ministry page, Eco fund Slovenia, through energy performance certificates and via many semi commercial pages supporting advanced energy efficient buildings with significant share of RES.</p> |
| <p>5.1.7 Demonstration Currently many projects are going on demonstration of nZEB (like FP7 EE-HIGHRISE, IEE projects...)</p> |
| <p>5.1.8 Education and training Education and training for all experts dealing with building elements relevant to energy efficiency and installers of RES devices are planned in the energy act, detailed activities were confirmed in Build up Skills Roadmap and action plan.</p> |
| 5.2 Non-residential buildings |
| <p>5.2.1 Relevant regulations Energy law (Reg. no. 17/14), Rules on efficient use of energy in buildings (Reg. no. 52/10), Action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf)</p> |
| <p>5.2.2 Relevant economic incentives and financing instruments Defined in Slovenian NEEAP 2020 and in Action plan for nearly zero energy buildings (under reception) Implemented through Eco fund in Slovenia.</p> |
| <p>5.2.3 Energy performance certificates' use and layout in relation to nZEB standard Current EPC bring the information on energy needs, primary energy and share of RES.</p> |
| <p>5.2.4 Supervision (energy advice and audits) Building inspectors control the implementation of requirements in technical regulation PURES 2010. National energy advisory network provides over 6000 advise per year also on nZEB.</p> |
| <p>5.2.5 Information (tools) National energy advisory network provides over 6000 advise per year also on nZEB.</p> |

Web sites with info on subsidies available at Ministry page, Eco fund Slovenia, through energy performance certificates and via many semi commercial pages supporting advanced energy efficient buildings with significant share of RES.

5.2.6 Demonstration

Currently many projects are going on demonstration of nZEB (like FP7 EE-HIGHRISE, IEE projects...)

5.2.7 Education and training

Education and training for all experts dealing with building elements relevant to energy efficiency and installers of RES devices are planned in the energy act, detailed activities were confirmed in Build up Skills Roadmap and action plan.

5.3 From your point of view, how would you evaluate the current measures that are in force? Please also try to describe the existing gap between what is in force and what should be in force in order to ensure that after 31 December 2020, all new buildings are nearly zero-energy buildings. Are there precise measures planned for the future?

Some possible updated measures in future:
Eco fund and promotion (open doors....energy advisory)
Innovative financing instruments
Schemes for supporting RES

6 Policies and measures for the promotion of all new buildings occupied and owned by public authorities being nearly zero-energy buildings after 31 December 2018

| |
|---|
| 6.1 All new buildings occupied and owned by public authorities |
| <p>6.1.1 Relevant regulations Regulation on Green public procurement</p> |
| <p>6.1.2 Relevant economic incentives and financing instruments Defined in Slovenian NEEAP 2020 and in Action plan for nearly zero energy buildings (under reception), Long term strategy for renovation of buildings (under preparation)</p> |
| <p>6.1.3 Energy performance certificates' use and layout in relation to nZEB standard Current EPC bring the information on energy use and share of RES.</p> |
| <p>6.1.4 Supervision (energy advice and audits) List of 3% building prepared, detailed plans will be part of long term strategy for renovation of existing buildings</p> |
| <p>6.1.5 Information (tools) In preparation.</p> |
| <p>6.1.6 Demonstration Currently many projects are going on demonstration of nZEB (like FP7 EE-HIGHRISE, IEE projects...).</p> |
| <p>6.1.7 Education and training Education and training for all experts dealing with building elements relevant to energy efficiency and installers of RES devices are planned in the energy act, detailed activities were confirmed in Build up Skills Roadmap and action plan. Activities are in preparation.</p> |
| <p>6.2 From your point of view, how would you evaluate the current measures that are in force? Please also describe the existing gap between what is in force and what should be in force in order to ensure that after 31 December 2018, all new public buildings are nearly zero-energy buildings. Are there precise measures planned for the future?</p> |
| <p>The first steps were done via Regulation on Green public procurement. Currently the experiences are being integrated in the revised version of Annex 7 to the Regulation on Green public procurement, dedicated to public buildings. Upgrade with nZEB targets is planned, and will be the core instrument for stimulating early implementation of nZEB in public buildings.</p> |

7 Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings

| 7.1 Residential buildings | |
|-------------------------------|--|
| 7.1.1 | Relevant regulations Energy law (Reg. no. 17/14), Rules on efficient use of energy in buildings (Reg. no. 52/10), Action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf) |
| 7.1.2 | Relevant economic incentives and financing instruments Defined in Slovenian NEEAP 2020 and in Action plan for nearly zero energy buildings (under reception), Long term strategy for renovation of buildings (under preparation) |
| 7.1.3 | Energy performance certificates' use and layout in relation to nZEB standard Current EPC bring the information on energy needs, primary energy and share of RES. |
| 7.1.4 | Supervision (energy advice and audits) Building inspectors control the implementation of requirements in technical regulation PURES 2010. National energy advisory network provides over 6000 advise per year also on nZEB. |
| 7.1.5 | Information (tools) National energy advisory network provides over 6000 advise per year also on nZEB. Web sites with info on subsidies available at Ministry page, Eco fund Slovenia, through energy performance certificates and via many semi commercial pages supporting advanced energy efficient buildings with significant share of RES. |
| 7.1.6 | Demonstration Currently many projects are going on demonstration of nZEB (like FP7 EE-HIGHRISE, IEE projects...) |
| 7.1.7 | Education and training Education and training for all experts dealing with building elements relevant to energy efficiency and installers of RES devices are planned in the energy act, detailed activities were confirmed in Build up Skills Roadmap and action plan. |
| 7.2 Non-residential buildings | |
| 7.2.1 | Relevant regulations Energy law (Reg. no. 17/14), Rules on efficient use of energy in buildings (Reg. no. 52/10), Action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf), Regulation on Green public procurement |
| 7.2.2 | Relevant economic incentives and financing instruments Defined in Slovenian NEEAP 2020 and in Action plan for nearly zero energy buildings (under reception), Long term strategy for renovation of buildings (under preparation) |
| 7.2.3 | Energy performance certificates' use and layout in relation to nZEB standard Current EPC bring the information on energy use and share of RES. |
| 7.2.4 | Supervision (energy advice and audits) List of 3% building prepared, detailed plans will be part of long term strategy for renovation of existing buildings |

7.2.5 Information (tools)

In preparation.

7.2.6 Demonstration

Currently many projects are going on demonstration of nZEB (like FP7 EE-HIGHRISE, IEE projects...)

7.2.7 Education and training

Education and training for all experts dealing with building elements relevant to energy efficiency and installers of RES devices are planned in the energy act, detailed activities were confirmed in Build up Skills Roadmap and action plan. Activities are in preparation.

7.3 From your point of view, how would you evaluate the current measures that are in force?

Please also try to describe the existing gap between what is in force and what should be in force in order to stimulate the transformation of buildings that are refurbished into nZEB. Are there precise measures planned for the future?

8 Additional Information

Please fill in any additional information on actions taken to increase the number of nearly zero-energy buildings in your country.

Appropriate measures are part of action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf).

9 Possible improvements

Where do you see most room for improvement in order to increase the number of nearly zero-energy buildings in your country? Please also try to give examples for appropriate measures.

Appropriate measures are part of action plan for nearly zero energy buildings (under reception - http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/AN_sNES/AN_sNES_Slovenija.pdf).

Annex- Definition of nZEB

| 1. General Information | | |
|---|---|---|
| Country | Slovenia | |
| Name of regulation ,directive, certification scheme | Pravilnik o učinkoviti rabi energije v stavbah, Ur. l. RS št. 52/2010 | |
| Editor of regulation, directive, certification scheme | Ministry for Infrastructure | |
| Year of introduction of current version | 2010 | |
| benchmark of current version (Select one) | <input checked="" type="radio"/> Energy Autonomous building <input checked="" type="radio"/> Efficient buildings <input checked="" type="radio"/> Net zero energy buildings <input checked="" type="radio"/> Plus energy buildings <input checked="" type="radio"/> Nearly zero energy buildings <input checked="" type="radio"/> Zero energy buildigns <input checked="" type="radio"/> Other | |
| Integration and consideration in national directive | Please add explanation/ comment/ source considered | |
| 2. Field of Application | | |
| 2.1 Building category | | |
| Select one and describe right is this typology included in the directive? Are special requirements or exceptions defined for this typology? If more than one definition exists, you can duplicate this appendix for each of them. | | |
| <i>Member States shall ensure that all new buildings are nearly zero- energy buildings by 31 December 2020 respectively after 31 December 2018 (occupied and owned by public authorities). For the purpose of the calculation buildings should be adequately classified into the [...] categories. References: EPBD article 9.1a/b, EPBD Annex I.</i> | | |
| Category | Please add explanation/ comment/ source | |
| <input checked="" type="radio"/> Residential | | |
| <input checked="" type="radio"/> Non-residential | | |
| <input checked="" type="radio"/> Residential and Non-residential | | |
| single family houses | included in the directive | Please add explanation/ comment/ source |
| apartment blocks | included in the directive | Please add explanation/ comment/ source |
| Offices | included in the directive | Please add explanation/ comment/ source |
| educational buildings | included in the directive | Please add explanation/ comment/ source |
| hospitals | included in the directive | Please add explanation/ comment/ source |
| hotels and restaurants | included in the directive | Please add explanation/ comment/ source |
| sports facilities | included in the directive | Please add explanation/ comment/ source |
| wholesale and retail trade service buildings | included in the directive | Please add explanation/ comment/ source |
| other types of energy-consuming buildings | included in the directive | Please add explanation/ comment/ source |
| 2.2 New/retrofit buildings | | |
| Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them. | | |
| <i>New, and existing buildings that are subject to major renovation, should meet minimum energy performance requirements adapted to the local climate.</i> | | |
| <i>Member States shall furthermore [...] stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings. Reference: EPBD preamble recital 15, EPBD article 9.2.</i> | | |

| | |
|---|--|
| <ul style="list-style-type: none"> <input type="radio"/> New buildings <input type="radio"/> Retrofit <input type="radio"/> New and retrofit | <p>Please add explanation/ comment/ source</p> |
| <p>2.3 Private/public buildings Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them.</p> | |
| <p><i>Member States shall ensure that by 31 December 2020, all new buildings are nearly zero- energy buildings and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings. Reference: EPBD article 9.1a/b</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> Private <input type="radio"/> Public <input type="radio"/> Public and private | <p>Please add explanation/ comment/ source</p> |
| <p>3. Energy Balance and calculation</p> | |
| <p>3.1 Balance Type Describe how renewable energy is calculated / included in the energy balance (e.g. renewable heat from solar thermal collectors reduces energy use for heat and DHW; renewable electricity reduces/compensates delivered electricity).</p> | |
| <p><i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources</i> <i>Energy performance of a building means the calculated or measured amount of energy needed to meet the energy demand [...]. Reference: EPBD article 2.2, EPBD article 2.4</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> energy demand vs energy generation <input type="radio"/> energy import vs energy export <input type="radio"/> virtual balance between demand and generation <input type="radio"/> not specified <input type="radio"/> other | <p>Please add explanation/ comment/ source</p> |
| <p>3.2 Physical boundary Select the widest possible boundary and describe right if/which further subdivisions are possible</p> | |
| <p><i>This directive lays down requirements as regards the common general framework for [...] buildings and building units. [...] building' means a roofed construction having walls, for which energy is used to condition the indoor climate. Reference: EPBD article 1.2, EPBD article 2.1</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> single building <input type="radio"/> building unit <input type="radio"/> building unit <input type="radio"/> building site <input type="radio"/> cluster of buildings <input type="radio"/> quarter or city <input type="radio"/> other | <p>Please add explanation/ comment/ source</p> |
| <p>3.3 System boundary demand / energy uses included Define if this load sector is included in the energy balance calculation (other requirements like maximum consumption values can be described below under item 5, further requirements).</p> | |
| <p><i>[...] energy performance of a building means the calculated or measured amount of energy needed to meet the energy demand associated with a typical use of the building, which includes, inter alia, energy used for heating, cooling, ventilation, hot water and lighting. Reference: EPBD article 2.4</i></p> | |

| | | |
|--|---|---|
| space heating, domestic hot water | considered | Please add explanation/ comment/ source |
| ventilation, cooling, air conditioning | considered | Please add explanation/ comment/ source |
| auxiliary energy | considered | Please add explanation/ comment/ source |
| lighting | considered | Please add explanation/ comment/ source |
| plug loads, appliances, IT | not considered | Please add explanation/ comment/ source |
| central services | not considered | Please add explanation/ comment/ source |
| electric vehicles | not considered | Please add explanation/ comment/ source |
| embodied energy | not considered | Please add explanation/ comment/ source |
| 3.4 System boundary generation / renewable energy sources included Select and explain right (e.g. only in building's physical footprint, on-site, on-site incl. import of off-site renewables like pellets, wood chips, rape oil etc.). How is CHP (based on non-renewable energy carriers like natural gas or oil) included? <i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. [...] energy from renewable sources means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases. [...] minimum levels of energy from renewable sources [...] to be fulfilled, inter alia, through district heating and cooling [...]. Reference: EPBD article 2.2, EPBD article 2.6, EPBD article 13.4</i> | | |
| generation on-site | considered | Please add explanation/ comment/ source |
| generation near by | considered | Please add explanation/ comment/ source |
| generation external | not considered | Please add explanation/ comment/ source |
| crediting | not considered | Please add explanation/ comment/ source |
| 3.5 Balance period / calculation step What is the defined period of time over which the balance is calculated? Is the calculation period divided into calculation steps (e.g. one hour, one month or one heating and/or cooling season)? <i>[...] The methodology for calculating energy performance should be based not only on the season in which heating is required, but should cover the annual energy performance of a building [...]. Reference: EPBD preamble recital 9 [...] requirements should be set with a view to [...] the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building [...]. Reference: EPBD preamble recital 10.</i> | | |
| <input checked="" type="radio"/> Life cycle balance <input checked="" type="radio"/> Yearly <input checked="" type="radio"/> Seasonal <input checked="" type="radio"/> Other | Please add explanation/ comment/ source | |
| 3.6 Monthly accounting limitation Is a monthly accounting limit defined? Is it based on end energy (e.g. monthly electricity generation compensates monthly electricity loads) or on primary energy (any monthly generation compensates any loads)? Are surpluses transferred to an annual balance? | | |
| <input checked="" type="radio"/> monthly source based end energy crediting <input checked="" type="radio"/> monthly primary energy crediting <input checked="" type="radio"/> nothing defined <input checked="" type="radio"/> other | Please add explanation/ comment/ source | |
| 4. Accounting system | | |
| 4.1 Normalization <i>[...] including a numerical indicator of primary energy use expressed in kWh/m² per year. Reference: EPBD article 9.3a</i> | | |
| <input checked="" type="radio"/> person <input checked="" type="radio"/> gross floor area | Please add explanation/ comment/ source | |

| | |
|--|--|
| <ul style="list-style-type: none"> <input type="radio"/> net floor area <input type="radio"/> gross volume <input type="radio"/> net volume <input type="radio"/> usable floor area <input type="radio"/> treated floor area <input type="radio"/> conditioned area <input type="radio"/> other | |
| <p>4.2 Primary metric</p> <p>Indicate which metric is used for the energy performance calculation / energy balance and give input on (the source of) the conversion factors on the right. Possible sources are e.g. EN 15603 or national and regional codes.</p> | |
| <p><i>The energy performance of a building shall be expressed in a transparent manner and shall include an energy performance indicator and a numeric indicator of primary energy use, based on primary energy factors per energy carrier, which may be based on national or regional annual weighted averages or a specific value for on-site production. Reference: EPBD Annex 1.</i></p> <p><i>[...] including a numerical indicator of primary energy use expressed in kWh/m² per year. Reference: EPBD 9.3a</i></p> <p><i>[...] primary energy' means energy from renewable and non-renewable sources which has not undergone any conversion or transformation process. Reference : EPBD article 2.5</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> energy need <input type="radio"/> energy use <input type="radio"/> delivered/site energy <input type="radio"/> primary / source energy (renewable part included) <input type="radio"/> primary / source energy (renewable part not included) <input type="radio"/> (equivalent) carbon emissions <input type="radio"/> exergy <input type="radio"/> energy costs <input type="radio"/> environmental credits <input type="radio"/> points (labeling system) <input type="radio"/> other | <p>Please add explanation/ comment/ source</p> |
| <p>4.3 Secondary metric</p> | |
| <ul style="list-style-type: none"> <input type="radio"/> energy use <input type="radio"/> energy need <input type="radio"/> delivered/site energy <input type="radio"/> primary / source energy (renewable part included) <input type="radio"/> primary / source energy (renewable part not included) | <p>Please add explanation/ comment/ source</p> |

| | |
|--|--|
| <ul style="list-style-type: none"> <input type="radio"/> (equivalent) carbon emissions <input type="radio"/> exergy <input type="radio"/> energy costs <input type="radio"/> environmental credits <input type="radio"/> points (labeling system) <input type="radio"/> other | |
| 4.4 Symmetric or asymmetric weighting | |
| <ul style="list-style-type: none"> <input type="radio"/> symmetrical weighting <input type="radio"/> asymmetrical weighting | <p>Please add explanation/ comment/ source</p> |
| <p>4.5 Time dependent weighting Static: no time dependent weighting (annual constant weighting/factors) Quasi-static: seasonal/monthly average weighting factors Dynamic: weighting factors based on shorter time periods /hourly basis (according to energy offer and demand in the grid)</p> <p><i>Primary energy factors [...] may be based on national or regional yearly average values and may take into account [...] European standards. Reference: EPBD 9.3a</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> static conversion factors <input type="radio"/> quasi static conversion factors <input type="radio"/> dynamic conversion factors | <p>Please add explanation/ comment/ source</p> |
| 5. Further requirements | |
| <p>5.1 Fraction of renewables Select and describe right if guidelines are given for any fraction of renewable energy and indicate how/at which level a certain fraction is calculated (e.g. solar thermal heat might be a fraction of energy use, electricity from PV a fraction of delivered energy.)</p> <p><i>Member States shall introduce [...] appropriate measures [...] to increase the share of all kinds of energy from renewable sources in the building sector [...]. By 31 December 2014, Member States shall [...] require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings [...] Reference: RED article 13.4</i></p> <p><i>[...] The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources [...]Reference : EPBD article 2.2</i></p> | |
| <ul style="list-style-type: none"> <input type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation | <p>Solar thermal, solar electricity, wind and hydroelectricity, renewable energy captured from ambient heat sources by heat pumps and free coolings and renewable fuels are calculated as a share of energy use.</p> |
| <p>5.2 Temporal performance Describe if any requirements are given for a temporal match between on-site energy load and on-site energy generation (load match) and which calculation procedures are applied.</p> | |
| <p>Load match</p> <ul style="list-style-type: none"> <input type="radio"/> defined <input type="radio"/> not defined | <p>Please add explanation/ comment/ source</p> |
| <p>Grid interaction</p> | |

| | |
|--|---|
| <input checked="" type="radio"/> defined <input type="radio"/> not defined | Please add explanation/ comment/ source |
| 5.3 Energy performance or rating requirements Are limitations given for a standard energy rating, an energy indicator or maximum demands for heating, cooling, embodied energy, demand of appliances, etc.? If yes, type the values and give explanations on the right | |
| <i>nearly zero-energy building means a building that has a very high energy performance [...]. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources [...]. The energy performance [...] shall [...] include an energy performance indicator and a numeric indicator of primary energy use [...]. Reference : EPBD article 2.2, EPBD Annex 1.</i> | |
| Performance or rating <input checked="" type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation | |
| Energy Performance indicator Is an energy performance indicator defined? If yes, type the values and the according unit. | Give further explanation |
| Numeric indicator of primary energy use Is a numeric indicator of primary energy use defined? If yes, type the values and the according unit. | Give further explanation |
| 5.4 General framework / prescriptive requirements Describe which guidelines are given for: Thermal characteristics (insulation, thermal bridges, thermal capacity, passive heating, internal loads, solar protection) Efficiency of installations (hot water supply, air-conditioning, lighting fan power) | |
| <i>The methodology shall [...] take into consideration: thermal characteristics (thermal capacity, insulation, passive heating, cooling elements, and thermal bridges), heating installation and hot water supply, air-conditioning installations, natural and mechanical ventilation, built-in lighting, the design, positioning and orientation of the building, outdoor climate, passive solar systems and solar protection, [...], internal loads. Reference: EPBD Annex 1</i> | |
| <input checked="" type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation | Please add explanation/ comment/ source |
| 5.5 Definition of comfort level & IAQ requirements (for winter and summer season, beside other national directives) Describe which guidelines are given for indoor climatic conditions, minimum or maximum indoor temperature, minimum lighting levels/ daylight availability, minimum ventilation rates/ natural ventilation, indoor air quality, max. CO2 levels, etc. | |
| <i>This Directive [...] takes into account [...] indoor climate requirements [...] Reference: EPBD article 1.1 The methodology shall [...] take into consideration: [...] indoor climatic conditions [...]Reference: EPBD Annex 1 That includes [...] indoor air-quality, adequate natural light [...].Reference: EPBD preamble recital 9</i> | |

| | |
|---|--|
| <ul style="list-style-type: none"> <input checked="" type="radio"/> defined <input type="radio"/> not defined <input type="radio"/> defined in other regulation | <p>Please add explanation/ comment/ source</p> |
| <p>5.6 Monitoring procedure Describe if and how a monitoring mandatory is formulated; calculated or measured values are used; an evaluation of the indoor environmental quality is considered; which calculation step is used.</p> | |
| <p><i>[...] energy performance of a building means the calculated or measured amount of energy needed [...] Reference: EPBD article 2.4</i> <i>Member States shall encourage the introduction of intelligent metering systems [...] and the installation of automation, control and monitoring systems [...]. Reference: EPBD article 8.2</i></p> | |
| <ul style="list-style-type: none"> <input checked="" type="radio"/> defined <input type="radio"/> not defined | <p>Please add explanation/ comment/ source</p> |

ECOFYS



sustainable energy for everyone

ECOFYS

sustainable energy for everyone



ECOFYS Germany GmbH

Am Wassermann 36
50829 Köln

T: +49 (0) 221 27070-100

F: +49 (0) 221 27070-011

E: info@ecofys.com

I: www.ecofys.com