

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



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

**By:** **Sven Schimschar, Nesen Surmeli, Andreas Hermelink**

**Date:** **15 May 2013**

**Project number:** **BUIDE13616**

© Ecofys 2013 by order of: European Commission

## Table of contents

<b>1</b>	<b>Starting point</b>	<b>4</b>
<b>2</b>	<b>Application of the definition of nearly zero-energy buildings</b>	<b>5</b>
<b>3</b>	<b>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</b>	<b>6</b>
<b>4</b>	<b>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</b>	<b>8</b>
<b>5</b>	<b>Policies and measures for the promotion of all new buildings being nearly zero-energy buildings after 31 December 2020</b>	<b>9</b>
<b>6</b>	<b>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</b>	<b>11</b>
<b>7</b>	<b>Policies and measures for the promotion of existing buildings undergoing major renovation being transformed to nearly zero-energy buildings</b>	<b>12</b>
<b>8</b>	<b>Additional Information</b>	<b>14</b>
<b>9</b>	<b>Possible improvements</b>	<b>15</b>
	<b>Annex- Definition of nZEB</b>	<b>16</b>

## 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)**

NZEB definition is at this instance given for single family buildings only, whereas NZEB definitions for other building uses are under development. Overview of national building stock for single family buildings in 2011. census shows that single family buildings form 48,5% of of building stock, with largest share of the stock built between 1961. - 1990.

	total	construction period										
		before 1919.	1919. – 1945.	1946. – 1960.	1961. – 1970.	1971. – 1980.	1981. – 1990.	1991. – 2000.	2001. – 2005.	2006. and later	unknown	unfinished
residential buildings	1.496.558	112.217	84.963	138.858	288.563	325.203	247.084	129.687	70.463	73.072	24.640	1.808
single family buildings	725.471	56.795	42.206	78.865	132.037	146.811	116.858	73.643	33.898	26.365	16.661	1.332

Energy performance requirements for the buildings have been developing since 1971. Before 1971. no specific requirements regarding thermal protection existed.

Technical regulation on thermal protection in buildings in 1971. set first requirements on U value of external building components. In 1981. and consequently 1987. new standards have been adopted closely relating to concurrent DIN standards on thermal requirements for buildings and building components.. Adoption of the calculation methodology according to HRN EN 837 and new regulation on building energy use in 2006. set the requirement for the useful heating energy consumption for residential and non-residential buildings. This has been further developed through regulation changes in 2009., until the latest changes in 2013. which limited the primary energy demand for single family residential buildings for the first time.

## 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.**

Chosen definition of nearly zero energy single family building is based on optimized building geometry, in difference to reference building which represents average characteristics of Croatian building stock. Average building description, considering the poor area/volume ration and insufficient passive utilization of solar gains does not allow for cost optimal nearly zero energy building. Very high solar gains in Croatia, particularly in littoral region stress high importance of solar gains control and high share of cooling energy demand in total building energy consumption.

Definition of NZEB single family building is given though the useful heating energy and primary energy demand - both of which have to be fulfilled, taking account heating and cooling energy, domestic hot water, ventilation and lighting.

### 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?

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

Requirements on fraction of renewable energies: Fraction of renewable energy hasn't been set in definition of NZEB single family buildings

Requirements on useful energy demand and primary energy demand are given in table below:

Reference building	Current requirement		New requirement (to be included with regulation changes)	
	E <sub>prim</sub>	Q <sub>H,nd</sub>	E <sub>prim</sub>	Q <sub>H,nd</sub>
	kWh/m <sup>2</sup> a	kWh/m <sup>2</sup> a	kWh/m <sup>2</sup> a	kWh/m <sup>2</sup> a
Continental Croatia				
Single family building - new construction	160	95,01	102	69,74
Nearly zero energy single family building	-	-	41	6,95
Littoral Croatia				
Single family building - new construction	160	95,01	66	38,03
Nearly zero energy single family building	-	-	33	0,19

#### 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.):

#### Miscellaneous:

Intermediate targets in the present moment are not likely to be achieved, primarily due to dramatic shrinkage of real estate market. Projections in all plans and strategic documents originated in unrealistic growth of the market in 2002. - 2009. period, with the highest peaks

in 2007., and this projections have to be continually adjusted to still low demand for new buildings.

#### 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**

Definition of public NZEB buildings is under development, and currently no requirements have been set for this building category.

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

Requirements on fraction of renewable energies: Definition of public NZEB buildings is under development, and currently no requirements have been set for this building category

Requirements on useful energy demand: Definition of public NZEB buildings is under development, and currently no requirements have been set for this building category

Requirements on primary energy demand: Definition of public NZEB buildings is under development, and currently no requirements have been set for this building category

##### **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.):**

##### **Miscellaneous:**

Definition of public NZEB buildings is under development, and currently no requirements have been set for this building category



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

5.1 Residential buildings	
5.1.1 Relevant regulations	Technical regulation on rational energy use and thermal protection in buildings
5.1.2 Relevant economic incentives and financing instruments	financial instruments available for buildings with energy rating better than minimum legal requirements, but none specific for nZEB
5.1.3 Energy performance certificates' use and layout in relation to nZEB standard	EPC does not specifically address the nZEB, but this buildings fulfil more relaxed requirement for A+ energy rating
5.1.4 Supervision (energy advice and audits)	mandatory energy audits and certification for all new buildings prior to use permit
5.1.5 Information (tools)	Ministry of physical planning and construction web portal
5.1.6 Demonstration	none
5.1.7 Education and training	none
5.2 Non-residential buildings	
5.2.1 Relevant regulations	under development
5.2.2 Relevant economic incentives and financing instruments	financial instruments available for buildings with energy rating better than minimum legal requirements, but none specific for nZEB
5.2.3 Energy performance certificates' use and layout in relation to nZEB standard	EPC does not specifically address the nZEB, but this buildings fulfil more relaxed requirement for A+ energy rating
5.2.4 Supervision (energy advice and audits)	mandatory energy audits and certification for all new buildings prior to use permit
5.2.5 Information (tools)	Ministry of physical planning and construction web portal
5.2.6 Demonstration	none
5.2.7 Education and training	none

**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?

Current measures for single family buildings are setting the path to primary energy calculation for all building uses. Development of design tools through single family nZEB should support uptake of primary energy calculation in other building uses in transition period set to the June 2014. for the full implementation of primary energy calculation algorithm for all building uses.

Requirements for new single family buildings can be met without significant building cost increase through optimized building geometry and layout, and it is expected that requirement for new nZEB single family buildings is going to be fulfilled using simple measures described in the Plan for increase of nZEB single family buildings by 2020.

## 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	
6.1.1 Relevant regulations	not set
6.1.2 Relevant economic incentives and financing instruments	financial instruments available for buildings with energy rating better than minimum legal requirements, but none specific for nZEB
6.1.3 Energy performance certificates' use and layout in relation to nZEB standard	EPC does not specifically address the nZEB, but this buildings fulfil more relaxed requirement for A+ energy rating
6.1.4 Supervision (energy advice and audits)	mandatory energy audits and certification for all new buildings prior to use permit
6.1.5 Information (tools)	Ministry of physical planning and construction web portal
6.1.6 Demonstration	none
6.1.7 Education and training	none
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?	
measures under development in relation to development of reference buildings	

## 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	Technical regulation on rational energy use and thermal protection in buildings
7.1.2 Relevant economic incentives and financing instruments	financial instruments available for buildings with energy rating better than minimum legal requirements, but none specific for nZEB
7.1.3 Energy performance certificates' use and layout in relation to nZEB standard	EPC does not specifically address the nZEB, but this buildings fulfil more relaxed requirement for A+ energy rating
7.1.4 Supervision (energy advice and audits)	mandatory energy audits and certification for all new buildings prior to use permit
7.1.5 Information (tools)	Ministry of physical planning and construction web portal
7.1.6 Demonstration	none
7.1.7 Education and training	none
7.2 Non-residential buildings	
7.2.1 Relevant regulations	under development
7.2.2 Relevant economic incentives and financing instruments	financial instruments available for buildings with energy rating better than minimum legal requirements, but none specific for nZEB
7.2.3 Energy performance certificates' use and layout in relation to nZEB standard	EPC does not specifically address the nZEB, but this buildings fulfil more relaxed requirement for A+ energy rating
7.2.4 Supervision (energy advice and audits)	mandatory energy audits and certification for all new buildings prior to use permit
7.2.5 Information (tools)	Ministry of physical planning and construction web portal
7.2.6 Demonstration	none

7.2.7 Education and training

none

**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?

Current measures for single family buildings are setting the path to primary energy calculation for all building uses. Development of design tools through single family nZEB should support uptake of primary energy calculation in other building uses in transition period set to the June 2014. for the full implementation of primary energy calculation algorithm for all building uses.

Requirements for new single family buildings can be met without significant building cost increase through optimized building geometry and layout, and it is expected that requirement for new nZEB single family buildings is going to be fulfilled using simple measures described in the Plan for increase of nZEB single family buildings by 2020.

## 8 Additional Information

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

## 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.**

Further improvements can be reached through the smart grid development and development of district heating and cooling due to large share of cooling energy in energy balance of nZEB; PV application on nZEB can cover buildings annual energy demand, but management and storage of energy limits the application in residential buildings for which it has been considered.

Redefinition of system boundary for RES in nZEB definition allowing for more relaxed relation between RES production facilities at district level opposed to building site boundary could allow for cost effective nZEB in other building uses than residential single family buildings in dense urban fabric.

## Annex- Definition of nZEB

1. General Information		
Country	Croatia	
Name of regulation ,directive, certification scheme		
Editor of regulation, directive, certification scheme		
Year of introduction of current version	2013.	
benchmark of current version (Select one)	<input type="radio"/> Energy Autonomous building <input type="radio"/> Efficient buildings <input type="radio"/> Net zero energy buildings <input type="radio"/> Plus energy buildings <input checked="" type="radio"/> Nearly zero energy buildings <input type="radio"/> Zero energy buildings <input type="radio"/> Other	
Integration and consideration in national directive	Please add explanation/ comment/ source  will be considered	
2. Field of Application		
<b>2.1 Building category</b> 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>		
<b>Category</b> <input checked="" type="radio"/> Residential <input type="radio"/> Non-residential <input type="radio"/> Residential and Non-residential	Please add explanation/ comment/ source	
single family houses	included in the directive	Please add explanation/ comment/ source
apartment blocks	not defined	Please add explanation/ comment/ source
Offices	not defined	Please add explanation/ comment/ source
educational buildings	not defined	Please add explanation/ comment/ source
hospitals	not defined	Please add explanation/ comment/ source
hotels and restaurants	not defined	Please add explanation/ comment/ source
sports facilities	not defined	Please add explanation/ comment/ source
wholesale and retail trade service buildings	not defined	Please add explanation/ comment/ source
other types of energy-consuming buildings	not defined	Please add explanation/ comment/ source
<b>2.2 New/retrofit buildings</b> 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.          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>		



<input type="radio"/> New buildings  <input type="radio"/> Retrofit  <input checked="" type="radio"/> New and retrofit	Please add explanation/ comment/ source
<b>2.3 Private/public buildings</b> <b>Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them.</b> <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>	
<input checked="" type="radio"/> Private  <input type="radio"/> Public  <input type="radio"/> Public and private	Please add explanation/ comment/ source
<b>3. Energy Balance and calculation</b> <b>3.1 Balance Type</b> 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). <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>	
<input type="radio"/> energy demand vs energy generation  <input type="radio"/> energy import vs energy export  <input checked="" type="radio"/> virtual balance between demand and generation  <input type="radio"/> not specified  <input type="radio"/> other	Please add explanation/ comment/ source renewable heat from solar thermal collector reduces energy use for DHW ; renewable electricity reduces energy use if used within system borders - electricity exported across system borders is excluded from building energy balance
<b>3.2 Physical boundary</b> Select the widest possible boundary and describe right if/which further subdivisions are possible <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>	
<input type="radio"/> single building  <input type="radio"/> building unit  <input type="radio"/> building unit	Please add explanation/ comment/ source building site might include and allow for further subdivision to single building and/or building units

<input checked="" type="radio"/> building site  <input type="radio"/> cluster of buildings  <input type="radio"/> quarter or city  <input type="radio"/> other		
<b>3.3 System boundary demand / energy uses included</b> 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).		
<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>		
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	considered	Please add explanation/ comment/ source
electric vehicles	not considered	Please add explanation/ comment/ source
embodied energy	not considered	Please add explanation/ comment/ source
<b>3.4 System boundary generation / renewable energy sources included</b> 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  on-site inclusive import of off-site renewables (wood pellets, wood chips)
generation near by	not considered	Please add explanation/ comment/ source
generation external	not considered	Please add explanation/ comment/ source
crediting	not considered	Please add explanation/ comment/ source
<b>3.5 Balance period / calculation step</b> 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 type="radio"/> Yearly  <input type="radio"/> Seasonal  <input type="radio"/> Other	Please add explanation/ comment/ source  monthly calculation period for heating energy demand, hourly calculation period for cooling energy demand	

<b>3.6 Monthly accounting limitation</b> 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 type="radio"/> monthly source based end energy crediting <input type="radio"/> monthly primary energy crediting <input checked="" type="radio"/> nothing defined <input type="radio"/> other	Please add explanation/ comment/ source
<b>4. Accounting system</b>	
<b>4.1 Normalization</b>	
[...] including a numerical indicator of primary energy use expressed in kWh/m <sup>2</sup> per year. Reference: EPBD article 9.3a	
<input type="radio"/> person <input type="radio"/> gross floor area <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 checked="" type="radio"/> conditioned area <input type="radio"/> other	Please add explanation/ comment/ source
<b>4.2 Primary metric</b> 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.	
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. [...] including a numerical indicator of primary energy use expressed in kWh/m <sup>2</sup> per year. Reference: EPBD 9.3a [...] primary energy' means energy from renewable and non- renewable sources which has not undergone any conversion or transformation process. Reference : EPBD article 2.5	
<input checked="" type="radio"/> energy need <input type="radio"/> energy use <input type="radio"/> delivered/site energy <input type="radio"/> primary / source energy (renewable part included)	Please add explanation/ comment/ source energy performance is expressed based on useful heating energy calculation

<p><input type="radio"/> primary / source energy (renewable part not included)</p> <p><input type="radio"/> (equivalent) carbon emissions</p> <p><input type="radio"/> exergy</p> <p><input type="radio"/> energy costs</p> <p><input type="radio"/> environmental credits</p> <p><input type="radio"/> points (labeling system)</p> <p><input type="radio"/> other</p>	
<b>4.3 Secondary metric</b>	
<p><input type="radio"/> energy use</p> <p><input type="radio"/> energy need</p> <p><input type="radio"/> delivered/site energy</p> <p><input type="radio"/> primary / source energy (renewable part included)</p> <p><input type="radio"/> primary / source energy (renewable part not included)</p> <p><input type="radio"/> (equivalent) carbon emissions</p> <p><input type="radio"/> exergy</p> <p><input type="radio"/> energy costs</p> <p><input type="radio"/> environmental credits</p> <p><input type="radio"/> points (labeling system)</p> <p><input type="radio"/> other</p>	<p>Please add explanation/ comment/ source</p>
<b>4.4 Symmetric or asymmetric weighting</b>	
<p><input type="radio"/> symmetrical weighting</p> <p><input type="radio"/> asymmetrical weighting</p>	<p>Please add explanation/ comment/ source</p>

<b>4.5 Time dependent weighting</b> 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)	
<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>	
<input checked="" type="radio"/> <b>static conversion factors</b>  <input type="radio"/> <b>quasi static conversion factors</b>  <input type="radio"/> <b>dynamic conversion factors</b>	Please add explanation/ comment/ source primary energy factors are based on national energy balances for 2010- 2012.
<b>5. Further requirements</b>	
<b>5.1 Fraction of renewables</b> 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.)	
<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> <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>	
<input type="radio"/> <b>defined</b>  <input checked="" type="radio"/> <b>not defined</b>  <input type="radio"/> <b>defined in other regulation</b>	Please add explanation/ comment/ source
<b>5.2 Temporal performance</b> 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.	
<u><b>Load match</b></u>  <input type="radio"/> <b>defined</b>  <input checked="" type="radio"/> <b>not defined</b>	Please add explanation/ comment/ source
<u><b>Grid interaction</b></u>  <input type="radio"/> <b>defined</b>  <input checked="" type="radio"/> <b>not defined</b>	Please add explanation/ comment/ source
<b>5.3 Energy performance or rating requirements</b>	

<p>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</p> <p><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 [...]</i>  <i>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></p>	
<p><b>Performance or rating</b></p> <p><input type="radio"/> defined</p> <p><input checked="" type="radio"/> not defined</p> <p><input type="radio"/> defined in other regulation</p>	<p>Please add explanation/ comment/ source</p>
<p><b>Energy Performance indicator</b>  <math>Q_{H,nd} &lt; 6,95 \text{ kWh/m}^2\text{a}</math>          (continental Croatia)  <math>Q_{H,nd} &lt; 0,19 \text{ kWh/m}^2\text{a}</math> (littoral Croatia)</p>	<p>Give further explanation</p> <p>the best energy performance rating is lower than minimum requirements for NZEB, therefore no particular EP indicator exists</p>
<p><b>Numeric indicator of primary energy use</b>  <math>E_{prim} &lt; 33 \text{ kWh/m}^2\text{a}</math> (littoral Croatia)  <math>E_{prim} &lt; 41 \text{ kWh/m}^2\text{a}</math> (continental Croatia)</p>	<p>Give further explanation</p>
<p><b>5.4 General framework / prescriptive requirements</b>          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)</p> <p><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></p>	
<p><input checked="" type="radio"/> defined</p> <p><input type="radio"/> not defined</p> <p><input type="radio"/> defined in other regulation</p>	<p>Please add explanation/ comment/ source</p> <p>appliances, metering</p>
<p><b>5.5 Definition of comfort level &amp; IAQ requirements (for winter and summer season, beside other national directives)</b>          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.</p> <p><i>This Directive [...] takes into account [...] indoor climate requirements [...] Reference: EPBD article 1.1</i>  <i>The methodology shall [...] take into consideration: [...] indoor climatic conditions [...] Reference: EPBD Annex 1</i>  <i>That includes [...] indoor air-quality, adequate natural light [...]. Reference: EPBD preamble recital 9</i></p>	
<p><input checked="" type="radio"/> defined</p>	<p>Please add explanation/ comment/ source</p> <p>indoor min/max temperature, minimum air change rate, heat recovery efficiency, building fabric</p>

<input type="radio"/> not defined  <input type="radio"/> defined in other regulation	
<b>5.6 Monitoring procedure</b> 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.	
<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>	
<input checked="" type="radio"/> defined  <input type="radio"/> not defined	<small>Please add explanation/ comment/ source</small> calculated values are used for building energy rating



sustainable energy for everyone





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](mailto:info@ecofys.com)

I: [www.ecofys.com](http://www.ecofys.com)