



CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

EPBD Key Implementation Decisions in Croatia

Status in December 2016

AUTHORS

Nada Marđetko Škoro

NATIONAL WEBSITES

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1. Key Implementation Decisions, KIDs

no	Key Implementation Decisions - General Background	Description / value / response	Comments	Description												
1.1	Definition of public buildings (according to Article 9 b)	Public sector buildings are buildings that are owned and used by public authorities. Public sector includes budgetary and extra-budgetary users of the state budget and budget users of local and regional (regional) governments authorities	Technical regulation on rational use of energy and heat retention in buildings (OG 128/2015) Energy Efficiency Act (OG 127/2014), Article 4													
1.2	Definition of public buildings used by the public (according to Article 13)	Public building means a building or a part thereof used by public authorities for performing their activities, a building or a part thereof used for housing of specific population groups and a non-residential building or part thereof in which a number of people are present or a larger number of people are provided a service	Building Act (OG 153/2013, 20/2017), Article 3 Housing of specific population groups includes housing for elderly persons, children, etc.													
1.3	Number of residential buildings	<table border="1"> <thead> <tr> <th></th> <th>Number</th> <th>Area m²</th> </tr> </thead> <tbody> <tr> <td>Multi-family houses</td> <td>290,689</td> <td>55,438,063</td> </tr> <tr> <td>Family houses</td> <td>471,708</td> <td>86,738,615</td> </tr> <tr> <td>Total residential</td> <td>762,397</td> <td>142,176,678</td> </tr> </tbody> </table>		Number	Area m ²	Multi-family houses	290,689	55,438,063	Family houses	471,708	86,738,615	Total residential	762,397	142,176,678	Long Term Strategy for Mobilising Investment in the Renovation of the National Building Stock of the Republic of Croatia Total number includes buildings constructed by the end of 2011	
	Number	Area m ²														
Multi-family houses	290,689	55,438,063														
Family houses	471,708	86,738,615														
Total residential	762,397	142,176,678														
1.4	Number of non-residential buildings	<table border="1"> <thead> <tr> <th></th> <th>Number</th> <th>Area m²</th> </tr> </thead> <tbody> <tr> <td>Public buildings</td> <td>80,196</td> <td>13,801,902</td> </tr> <tr> <td>Commercial buildings</td> <td>44,728</td> <td>36,540,459</td> </tr> <tr> <td>Total non-residential</td> <td>124,924</td> <td>50,342,361</td> </tr> </tbody> </table>		Number	Area m ²	Public buildings	80,196	13,801,902	Commercial buildings	44,728	36,540,459	Total non-residential	124,924	50,342,361	Long Term Strategy for Mobilising Investment in the Renovation of the National Building Stock of the Republic of Croatia Total number includes buildings constructed by the end of 2011	
	Number	Area m ²														
Public buildings	80,196	13,801,902														
Commercial buildings	44,728	36,540,459														
Total non-residential	124,924	50,342,361														

1.5	If possible, share of public buildings included in the number given in 1.4	64%	Long Term Strategy for Mobilising Investment in the Renovation of the National Building Stock of the Republic of Croatia				
1.6	If possible, share of commercial buildings included in the number given in 1.4	36%	Long Term Strategy for Mobilising Investment in the Renovation of the National Building Stock of the Republic of Croatia				
1.7	Number of buildings constructed per year (estimate)	Number of finished buildings		Croatian Bureau of Statistics			
		Year	Total			Residential	Non-residential
		2013	5,739			4,566	1,173
		2014	4,971			3,841	1,130
		2015	4,641	3,678	963		
1.8	If possible, share of residential buildings constructed per year (estimate, included in the number given in 1.7)	80% in 2013 77% in 2014 79% in 2015		Croatian Bureau of Statistics			
1.9	If possible, share of non-residential buildings constructed per year (estimate, included in the number given in 1.7)	20% in 2013 23% in 2014 21% in 2015		Croatian Bureau of Statistics			
1.10	Useful floor area of buildings constructed per year in million square meters (estimate)	Useful floor area m ²		Croatian Bureau of Statistics			
		Year	Total			Residential	Non-residential
		2013	1,943,383			1,256,406	686,977
		2014	1,658,467			1,018,964	639,503
		2015	1,898,127	919,113	733,413		

2. KIDs for New Buildings

no	Key Implementation Decision - New Buildings	Description / value / response	Comments	Description								
2.1	Requirements for energy Performance of residential buildings in current building code	<p>Requirements are established for residential buildings heated and/or cooled at indoor temperature of 18° C or higher:</p> <ul style="list-style-type: none"> • Maximum permitted annual energy needs for heating per unit of the surface area of usable floor area of a building (Q",Hnd) • Maximum permitted U-value • Maximum permitted annual primary energy consumption per unit of the surface area of usable floor area of a building (E" prim) • Maximum permitted delivered energy per unit of the surface area of usable floor area of a building (E" del) • Maximum permitted annual energy needs for cooling per unit of the surface area of usable floor area of a building (Q" C,nd) • Share of RES <p>Primary energy includes the heating and cooling energy needs, energy for ventilation and domestic hot water</p> <p>E"prim / E"del [kWh/(m²-a)]</p> <ul style="list-style-type: none"> • Multi-family houses <table border="0" style="margin-left: 20px;"> <tr> <td>continental</td> <td>120/80</td> </tr> <tr> <td>littoral</td> <td>90/60</td> </tr> </table> • Family houses <table border="0" style="margin-left: 20px;"> <tr> <td>continental</td> <td>115/80</td> </tr> <tr> <td>littoral</td> <td>70/50</td> </tr> </table> 	continental	120/80	littoral	90/60	continental	115/80	littoral	70/50	Technical regulation on rational use of energy and heat retention in buildings (OG 128/2015)	
continental	120/80											
littoral	90/60											
continental	115/80											
littoral	70/50											
2.2	Requirements for energy Performance of non-residential buildings in current building code	<p>Requirements are established for non-residential buildings heated and/or cooled at indoor temperature of 18 °C or higher:</p> <ul style="list-style-type: none"> • Maximum permitted Q",Hnd • Maximum permitted U-value 	Technical regulation on rational use of energy and heat retention in buildings (OG 128/2015)									

- Maximum permitted E" prim
- Maximum permitted E" del
- Maximum permitted Q" C,nd
- Share of RES

Primary energy includes the heating and cooling energy needs, energy for ventilation and domestic hot water for residential buildings.

Primary energy includes the heating and cooling energy needs, energy for ventilation, domestic hot water and lighting for non-residential buildings.

E"prim / E"del [kWh/(m²·a)]

- Offices

continental	70/40
littoral	70/40
- Educational

continental	65/60
littoral	60/60
- Hospitals

continental	300/220
littoral	300/220
- Hotels and restaurants

continental	130/90
littoral	80/50
- Sports facilities

continental	400/290
littoral	170/110
- Wholesale and retail trade services

continental	450/290
littoral	280/170
- Other types

continental	150/80
littoral	100/60

2.3	Is the performance level of nearly zero energy (NZEB) for new buildings set in national legislation?	Yes	Technical regulation on rational use of energy and heat retention in buildings (OG 128/2015)	
2.4	Nearly zero energy (NZEB) level for residential buildings (if set)	E^{prim} [kWh/(m ² -a)] <ul style="list-style-type: none"> • Multi-family houses <ul style="list-style-type: none"> continental 80 littoral 50 • Family houses <ul style="list-style-type: none"> continental 45 littoral 35 	Technical regulation on rational use of energy and heat retention in buildings (OG 128/2015)	
2.5	Nearly zero energy (NZEB) level for non- residential buildings (if set)	E^{prim} [kWh/(m ² -a)] <ul style="list-style-type: none"> • Offices <ul style="list-style-type: none"> continental 35 littoral 25 • Educational <ul style="list-style-type: none"> continental 55 littoral 55 • Hospitals <ul style="list-style-type: none"> continental 250 littoral 250 • Hotels and restaurants <ul style="list-style-type: none"> continental 90 littoral 70 • Sports facilities <ul style="list-style-type: none"> continental 210 littoral 150 • Wholesale and retail trade services <ul style="list-style-type: none"> continental 170 littoral 150 	Set in values, formula for calculation or text for instance based on model building.	

2.6	Are nearly zero energy buildings (NZEB) defined using a carbon or environment indicator	No		
2.7	Year for nearly zero energy (NZEB) to be implemented for residential buildings	31 December 2020	All new buildings (residential and non-residential) that are under construction must comply with the NZEB standard by 31 December 2020. The main design of the building should be prepared according to the requirements for NZEBs if application for building permit is submitted after 31 December 2019.	
2.8	Year for nearly zero energy (NZEB) to be implemented for non-residential buildings	31 December 2020	All new buildings (residential and non-residential) that are under construction must comply with the NZEB standard by 31 December 2020. The main design of the building should be prepared according to the requirements for NZEBs if application for building permit is submitted after 31 December 2019. All new buildings owned or occupied by public authorities must have NZEB performance after 31 December 2018. For buildings occupied and owned by public authorities the main design of the building should be prepared according to the requirements for NZEBs if application for building permit is submitted after 31 December 2017	
2.9	Is renewable energy a part of the overall value for NZEBs or an additional requirement	yes	NZEB fulfils criteria for RES if at least 30% of the annual primary energy is covered from RES	
2.10	Specific comfort criteria for new buildings, provide specific parameters for instance for airtightness, minimum ventilation	yes	The air change rate of indoor air in buildings where persons stay or work shall be at least 0.5 h-1. At the time	

	rates		<p>when the building is unoccupied, an air change rate of at least 0.2 h⁻¹ should be provided. The lowest air change rate shall be higher in individual parts of the building if necessary for the purpose of avoiding threats to hygiene and health conditions, and/or due to the use of open-flame heating and/or cooking devices. If it is not possible to ensure natural air ventilation that meets the requirements for the prescribed air quality, hybrid or mechanical ventilation should be designed. For multi-family residential buildings, airtightness requirements must be fulfilled for each apartment. For non-residential buildings, airtightness requirements must be fulfilled for the building envelope.</p> <p>Air permeability classification of windows, balcony doors and skylights shall comply with the requirements specified according to HRN EN 12207:2011.</p> <p>Indoor air comfort shall be determined by fulfilling requirements for heating, cooling, ventilation, thermal stability, indoor surface temperature, humidity, proper lighting and allowed noise. Recommended design values are determined in HRN EN 15251:2008.</p>	
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3. KIDs for Existing Buildings

no	Key Implementation Decision - Existing Buildings	Description / value / response	Comments	Description
3.1	Is the level of nearly zero energy (NZEB) for existing buildings set in national legislation?	No		
3.2	Is the level of nearly zero energy (NZEB) for existing buildings similar to the levels for new buildings?	Yes	The level of NZEB is set in legislation and it refers to new buildings. In order to become NZEB, an existing building undergoing renovation shall meet the same requirements set for new buildings.	
3.3	Definition of nearly zero energy (NZEB) for existing residential buildings (if different from new buildings)		Definition of NZEBs for existing buildings is the same as for new buildings	
3.4	Definition of nearly zero energy (NZEB) for existing non-residential buildings (if different from new buildings)		Definition of NZEBs for existing buildings is the same as for new buildings	
3.5	Overall minimum requirements in case of major-renovation	<p>Major renovation of the building means the renovation of a building where more than 25% of the surface of the envelope undergoes renovation.</p> <p>In the case of major renovation, the heat transmission coefficient of the entire building element shall fulfil the prescribed requirements.</p> <p>Buildings undergoing major renovation shall fulfil at least 10% of energy demand from RES which can be obtained from district or block heating based entirely or partially on energy from RES unless it is technically, functionally and economically feasible.</p>		

		<p>When reconstruction covers more than 75% of the surface of the heated building envelope, requirements are set on Q H,nd, E prim, Edel</p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">E"prim [kWh/(m²·a)]</th> <th colspan="2">E"del [kWh/(m²·a)]</th> </tr> <tr> <th>cont.</th> <th>litt.</th> <th>cont.</th> <th>litt.</th> </tr> </thead> <tbody> <tr> <td>Multi-family house</td> <td>180</td> <td>130</td> <td>120</td> <td>85</td> </tr> <tr> <td>Family house</td> <td>135</td> <td>80</td> <td>120</td> <td>60</td> </tr> <tr> <td>Offices</td> <td>75</td> <td>75</td> <td>40</td> <td>40</td> </tr> <tr> <td>Educational</td> <td>90</td> <td>75</td> <td>60</td> <td>60</td> </tr> <tr> <td>Hospitals</td> <td>340</td> <td>330</td> <td>250</td> <td>230</td> </tr> <tr> <td>Hotels and restaurants</td> <td>145</td> <td>115</td> <td>90</td> <td>80</td> </tr> <tr> <td>Sport facilities</td> <td>420</td> <td>215</td> <td>295</td> <td>190</td> </tr> <tr> <td>Whole sale and retail trade services</td> <td>475</td> <td>300</td> <td>290</td> <td>185</td> </tr> <tr> <td>Other types</td> <td>180</td> <td>130</td> <td>-</td> <td>-</td> </tr> </tbody> </table>		E"prim [kWh/(m ² ·a)]		E"del [kWh/(m ² ·a)]		cont.	litt.	cont.	litt.	Multi-family house	180	130	120	85	Family house	135	80	120	60	Offices	75	75	40	40	Educational	90	75	60	60	Hospitals	340	330	250	230	Hotels and restaurants	145	115	90	80	Sport facilities	420	215	295	190	Whole sale and retail trade services	475	300	290	185	Other types	180	130	-	-		
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3.6	Minimum requirements for individual building parts in case of renovation	For individual parts of building maximum allowed U-value for elements of new buildings and after reconstruction of existing buildings heated to a temperature of 18 °C or more, and heated between 12 °C and 18 °C in Continental and Littoral Climate are prescribed	Maximum U-Value																																																							

Building element	Maximum U-values			
	Indoor temperature			
	≥18 °C		<12 °C	
	cont.	litt.	cont.	litt.
External walls	0.30	0.45	0.50	0.60
Transparent facade elements (frame)	1.60	1.80	2.50	2.80
Glazing only	1.10	1.40	1.40	1.40
Roofs	0.25	0.30	0.40	0.50
Ceilings above external air	0.25	0.30	0.40	0.50
Walls and ceilings of non-heated rooms	0.40	0.60	0.90	1.20
Floor	0.40	0.50	0.65	0.80
External doors	2.00	2.40	2.90	2.90
Ceilings and floors between apartments	0.60	0.80	1.20	1.20
Cupolas, light bars	2.50	2.50	2.50	2.50
Windshields	3.00	3.00	3.00	3.00

4. KIDs for Energy Performance Certificates, EPCs

no	Key Implementation Decision - Energy Performance Certificates	Description / value / response	Comments	Description																																	
4.1	National database for EPCs	Yes	At the moment in testing phase, it is expected to be in the production by 1 st of March 2017																																		
4.2	Number of energy performance certificates per year (for instance average of 3 years)	Number of issued EPCs in 2015/2016 <table border="1"> <thead> <tr> <th>Number/type of building</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>Total</td> <td>47,428</td> <td>41,895</td> </tr> <tr> <td>Family houses</td> <td>15,202</td> <td>14,427</td> </tr> <tr> <td>Multi-family houses</td> <td>23,940</td> <td>17,418</td> </tr> <tr> <td>Offices</td> <td>2,568</td> <td>3,489</td> </tr> <tr> <td>Educational buildings</td> <td>641</td> <td>530</td> </tr> <tr> <td>Hospitals</td> <td>239</td> <td>210</td> </tr> <tr> <td>Hotels and restaurants</td> <td>2,368</td> <td>2,162</td> </tr> <tr> <td>Sports facilities</td> <td>159</td> <td>157</td> </tr> <tr> <td>Wholesale and retail trade service buildings</td> <td>1,260</td> <td>2,252</td> </tr> <tr> <td>Non-residential buildings in which energy is used to create certain conditions of conditioning</td> <td>483</td> <td>928</td> </tr> </tbody> </table>	Number/type of building	2015	2016	Total	47,428	41,895	Family houses	15,202	14,427	Multi-family houses	23,940	17,418	Offices	2,568	3,489	Educational buildings	641	530	Hospitals	239	210	Hotels and restaurants	2,368	2,162	Sports facilities	159	157	Wholesale and retail trade service buildings	1,260	2,252	Non-residential buildings in which energy is used to create certain conditions of conditioning	483	928		
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		Other non-residential buildings that are heated at a temperature of +18°C or higher (for example: a building for transport and communications, terminals, stations, traffic buildings, post offices, telecommunications buildings, buildings for cultural and art activities and entertainment, museums and libraries, etc.).	568	331		
4.3	Number of EPCs since start of scheme	<p>EPCs for the period 2010-2016:</p> <ul style="list-style-type: none"> • Total 158,488 • Residential buildings 126,905 • Non-residential buildings 31,583 				
4.4	Number of assessors	<p>Authorised natural and legal persons for energy certification of buildings:</p> <ul style="list-style-type: none"> • Total 1,847 • Natural persons 1,033 • Legal persons 817 <p>Authorised persons for regular inspection of heating and cooling/AC systems in buildings (included in the authorisation for energy certification of buildings):</p> <ul style="list-style-type: none"> • Total 343 • Natural persons 175 • Legal persons 168 			Registration in national database is mandatory	
4.5	Basic education requirements for assessors	<p>Basic education depends on the type of authorisation.</p> <p>The authorisation for energy certification and energy audits of buildings with a simple technical system shall be granted to a natural person who has a completed graduate university study in the field of architecture, civil engineering,</p>			Building act (OG 153/2013, 20/2017)	

mechanical engineering or electrical engineering or a completed specialist graduate professional programme in the field of architecture, civil engineering, mechanical engineering or electrical engineering.

Natural person shall fulfil the requirement of at least 5 years of professional working experience or 2 years of experience in the field of designing or performance of building surveillance (Building Act amendment, OG 20/2017).

The authorisation for energy certification and energy audits of buildings with a simple technical system shall be granted to a natural person who has a completed undergraduate university study or undergraduate professional programme in the field of architecture, civil engineering, mechanical engineering or electrical engineering and who fulfils the requirement of at least 10 years of professional working experience or 5 years of experience in the field of designing or performance of building surveillance (Building Act amendment, OG 20/2017).

The authorisation for energy certification and energy audits of buildings with a complex technical system shall be granted to a legal person employing at least one natural person who has a completed graduate university study in the field of architecture, civil engineering, mechanical engineering or electrical engineering or a completed specialist graduate professional programme in the field of architecture, civil engineering, mechanical engineering or electrical engineering and who has in his studies achieved at least 300 ECTS credits.

Natural person must fulfil the requirement of 5 years of professional working experience or 2 years of experience in the field of designing or performance of building surveillance (Building Act amendment, OG 20/2017).

4.5	Additional training demands for assessors	<p>The successful completion of the appropriate professional training programme (Module 1 and Module 2) is mandatory. Programmes are carried out by authorised institutions. Module 1 enables authorisation for energy audits and certification of buildings with a simple technical system, and Module 2 enables authorisation for energy audits and certification of buildings with a complex technical system. Module 1 has a duration of 40 hours and contains themes related to regulations, themes from the field of building physics, on heating systems, electric lighting, on the methodology of carrying out energy audits and applying computer tools. Module 2 also has a duration of 40 hours. It builds on the themes of Module 1, but with additional themes, e.g., RES, alternative energy supply systems, cooling devices, regulation and automation systems in buildings, electric lighting in buildings, public lighting, etc.</p> <p>Authorised persons have the obligation to attend annual programmes of skill upgrading. In Croatia, there are 11 regionally distributed institutions (faculties and professional organisations) that were granted authorisation for carrying out the training programme.</p>		
4.6	Quality assurance system	<p>All issued EPCs undergo administrative controls during their entry into the data base (registry).</p> <p>Five legal persons have been authorised to carry out detailed quality controls of the EPCs and of reports on regular inspection of heating and cooling /AC system of a building.</p>		

5. KIDs for Inspection Systems

no	Key Implementation Decision - Inspection Systems	Description / value / response	Comments	Description
5.1	Is there a national database for heating inspections	Yes	At the moment in testing phase. It is expected to be in the production phase by 1 st of March 2017.	
5.2	Is there a national database for cooling inspections / AC	Yes	At the moment in testing phase. It is expected to be in the production phase by 1 st of March 2017.	
5.3	Are inspection databases combined with EPC database for registration of EPCs and inspection reports	Yes	At the moment in testing phase. It is expected to be in the production phase by 1 st of March 2017.	
5.4	Chosen option A or B for heating systems (inspection or other measures)	A		
5.5	Number of heating inspections; reports per year (if option A)	35	Reports are registered in the data base	
5.6	Chosen option A or B for air - condition/cooling system (inspection or other measures)	A		
5.7	Number of air-condition / cooling system inspections; reports per year (if option A)	2	Reports are registered in the data base	



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