

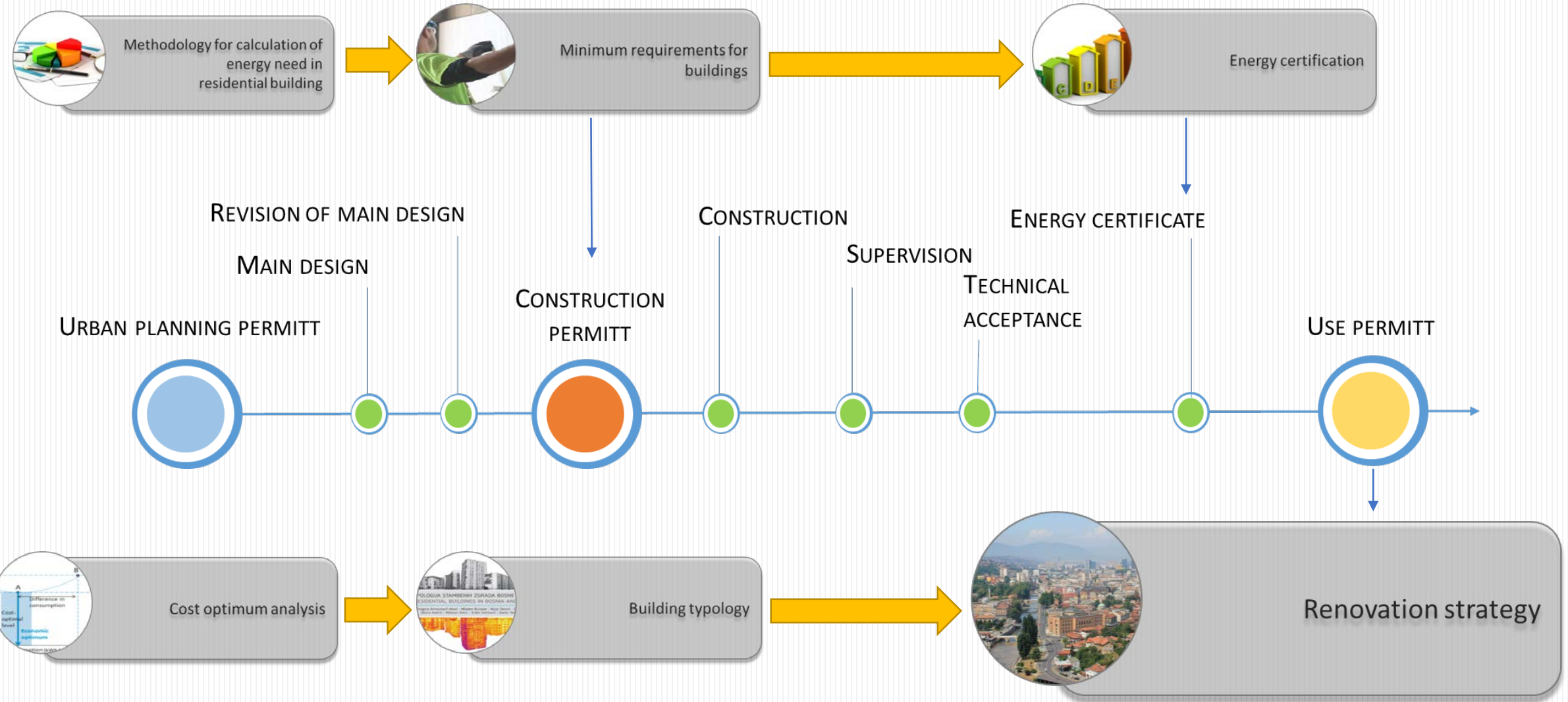


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Zusammenarbeit (GIZ) GmbH

# PLANNING FOR EE IN BUILDINGS IN BOSNIA AND HERZEGOVINA

Goran Krstovic

Promotion of Energy Efficiency in Bosnia and Herzegovina  
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)





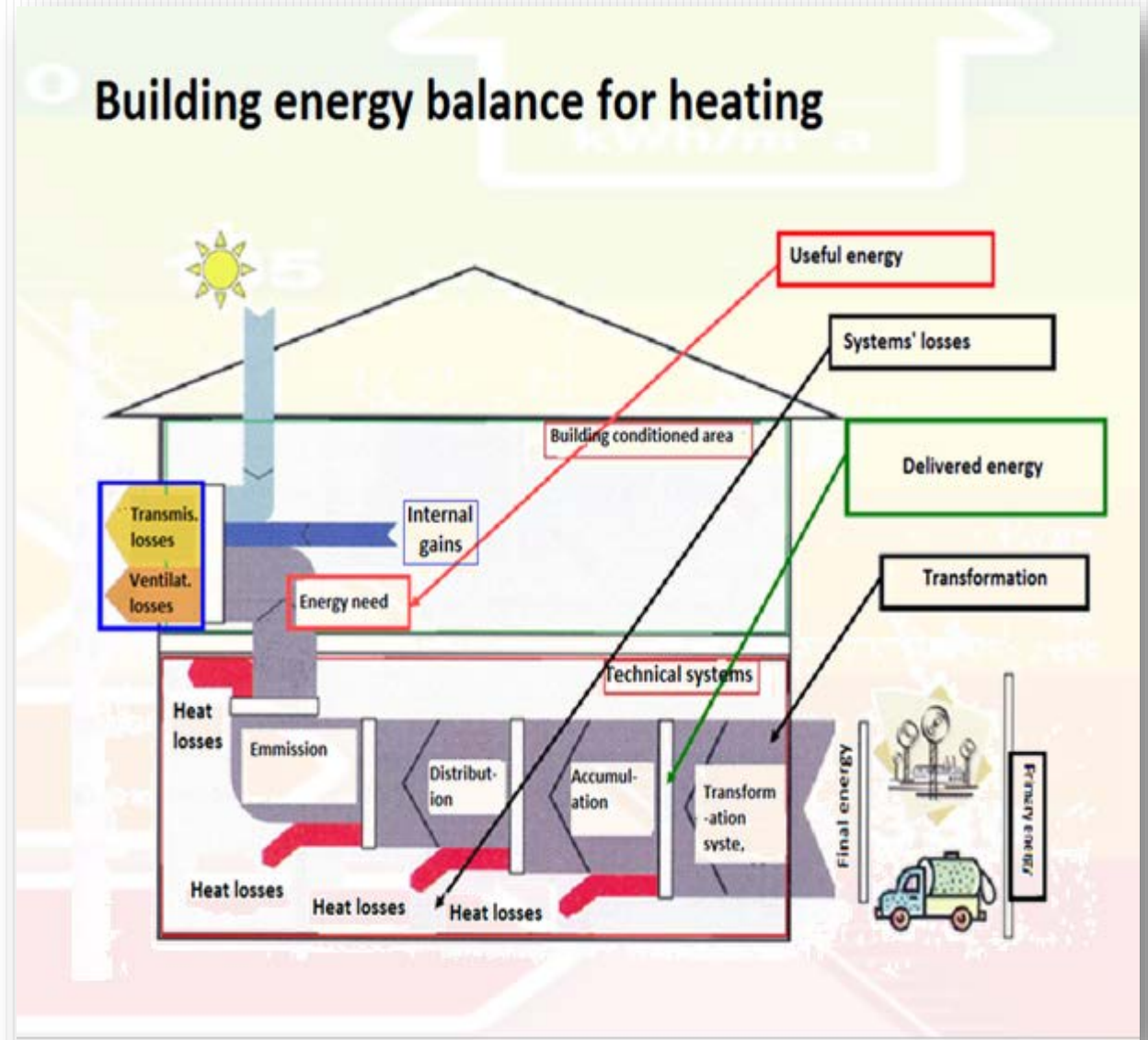
Methodology for calculation of energy need in residential building

$$Q_H = Q_{H,nd} + Q_w + Q_{H,ls} + Q_{W,ls} \quad [\text{kWh/a}]$$

$$E_{del} = Q_H + \frac{Q_c}{COP} + Q_{Ve} + Q_{aux} + E_L - E_{obnov} - E_{pov} \quad [\text{kWh/a}],$$

$$E_{prim} = \sum_i E_{del,i} \cdot f_{prim,del,i} - \sum_i E_{ex,i} \cdot f_{prim,ex,i} \quad [\text{kWh/a}],$$

- BAS Standards adopted
- Missing national annexes





## Minimum requirements for buildings

Residential building that is heated during the heating season at temperature of 18 °C or above, must be projected and built the way that yearly energy need per conditioned area,  $Q''_{H,nd}$  [kWh/(m<sup>2</sup>·a)], depending on the shape value,  $f_0$  (V/A):

$f_0 \leq 0,20$	$Q''_{H,nd} = 51,31 \text{ kWh}/(\text{m}^2 \cdot \text{a}),$
$0,20 < f_0 < 1,05$	$Q''_{H,nd} = (41,03 + 51,41 \cdot f_0) \text{ kWh}/(\text{m}^2 \cdot \text{a}),$
$f_0 \geq 1,05$	$Q''_{H,nd} = 95,01 \text{ kW} \cdot \text{h}/(\text{m}^2 \cdot \text{a}).$





## Energy certification

### New buildings

includes calculation of energy needs of the building and required annual specific energy for heating energy for reference climatic data and determining energy class building - data from the main project in relation to rational use of energy and thermal protection.

### Existing buildings

includes energy audit of the building, calculation of energy needs of the building and required annual specific energy for heating energy for reference climatic data and determining energy class building.

### Енергетски сертификат нестамбене зграде

Зграда  нова  постојећа

Врста зграде/  
врста зграде

Кл/кат

Адреса

Место

Београд, Мјестост/на  
или кортеж

Плошћу

Год. изградње

Енергетска класа зграде

Класа	Q <sub>норм</sub> (kWh/m <sup>2</sup> /год)	Процент
A+	≤ 15	
A	≤ 25	
B	≤ 50	
C	≤ 70	
D	≤ 90	
E	≤ 120	
F	≤ 150	
G	> 250	

Плошћу зграде

A<sub>н</sub> (m<sup>2</sup>)

V<sub>н</sub> (m<sup>3</sup>)

A<sub>н</sub> (m<sup>2</sup>)

V<sub>н</sub> (m<sup>3</sup>/год)

Плошћу зграде које је извршено енергетско прегледање

Општински енергетски центар

Општински енергетски центар

Год. изградње зграде

Сертификатни број

Овај сертификат издати је у складу са енергетском ефикасношћу (PE)

Координате на карти

Датум издавања сертификата

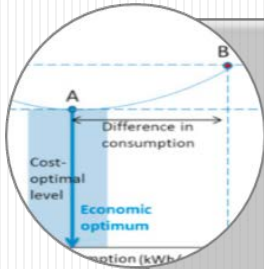
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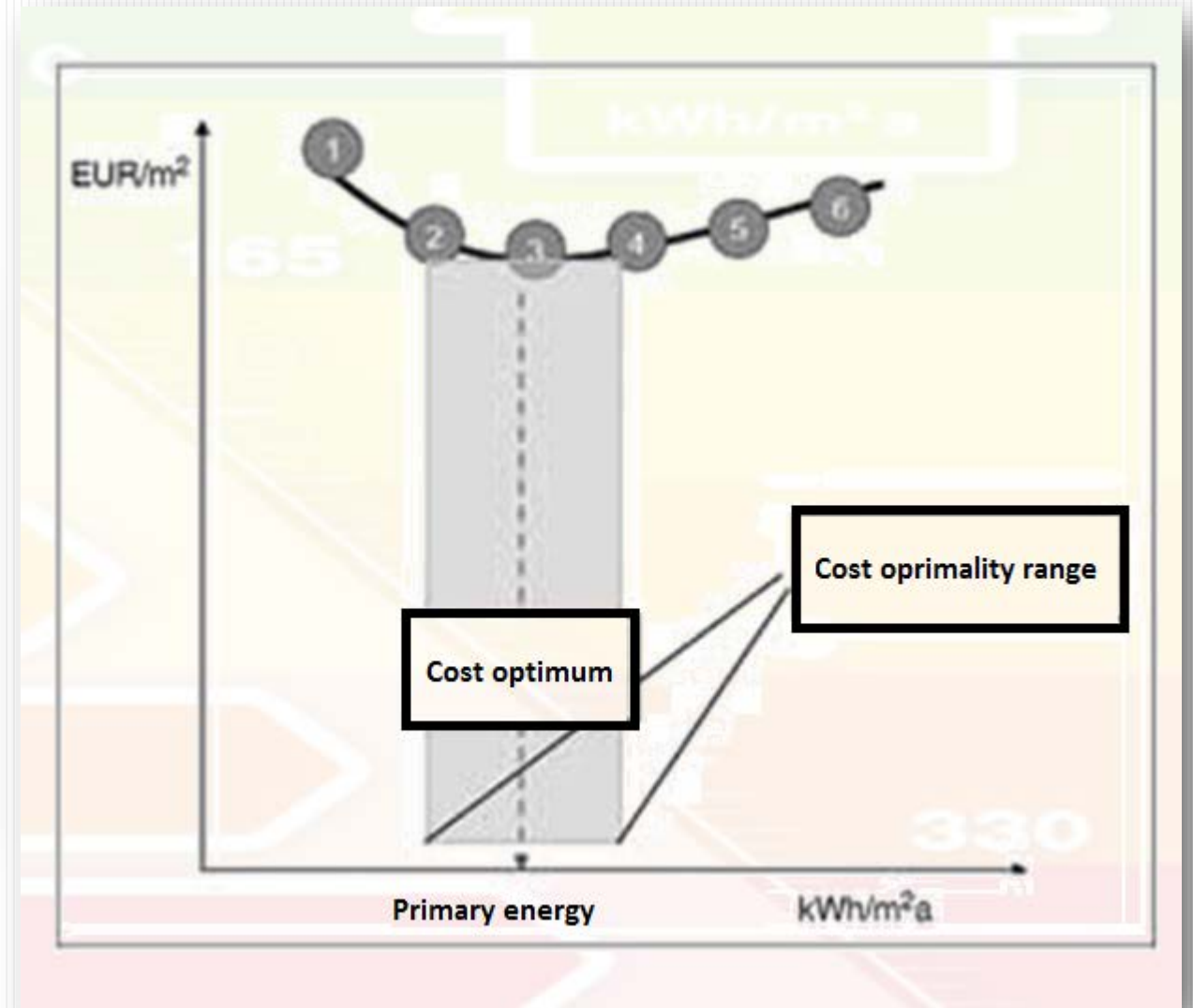
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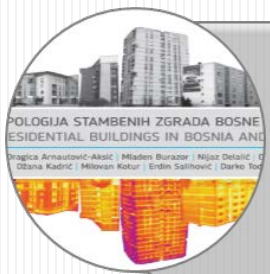
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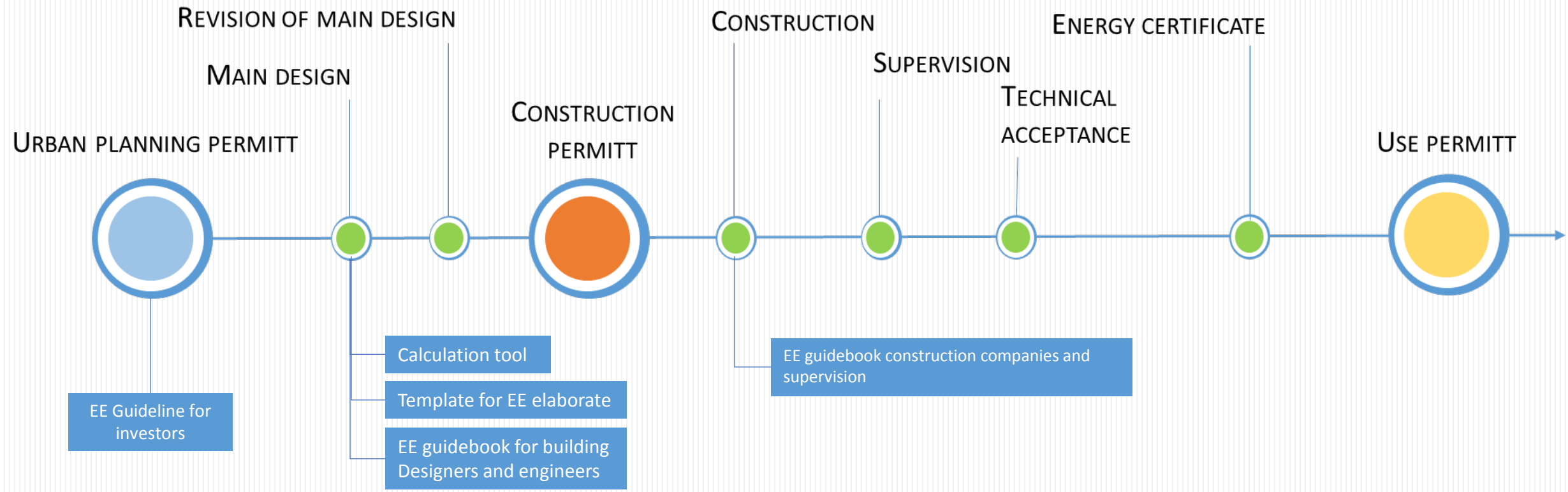


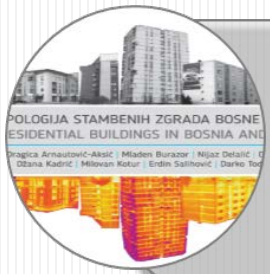
## Cost optimum analysis





# Building permitting regime





# Building typology

	INDIVIDUALNO STANOVANJE SINGLE-FAMILY HOUSING			KOLEKTIVNO STANOVANJE COLLECTIVE HOUSING		
	SLOBODNOSTOJEĆE KUĆE SINGLE-FAMILY HOUSES SH 1	KUĆE U NIZU TERRACED HOUSES TH 2	MANJE STAMBENE ZGRADE MULTI-FAMILY HOUSES MH 3	STAMBENE ZGRADE U NIZU / GRADSKOM BLOKU ATTACHED APARTMENT BUILDINGS IN URBAN BLOCKS AB1 4	VELIKI STAMBENI BLOKOV / STAMBENE LAMELE APARTMENT BLOCKS AB2 5	NEBODERI HIGH-RISE BUILDING H 6
<b>A</b> <1945						
<b>B</b> 1946-1960						
<b>C</b> 1961-1970						
<b>D</b> 1971-1980						
<b>E</b> 1981-1990						
<b>F</b> 1991-2014						

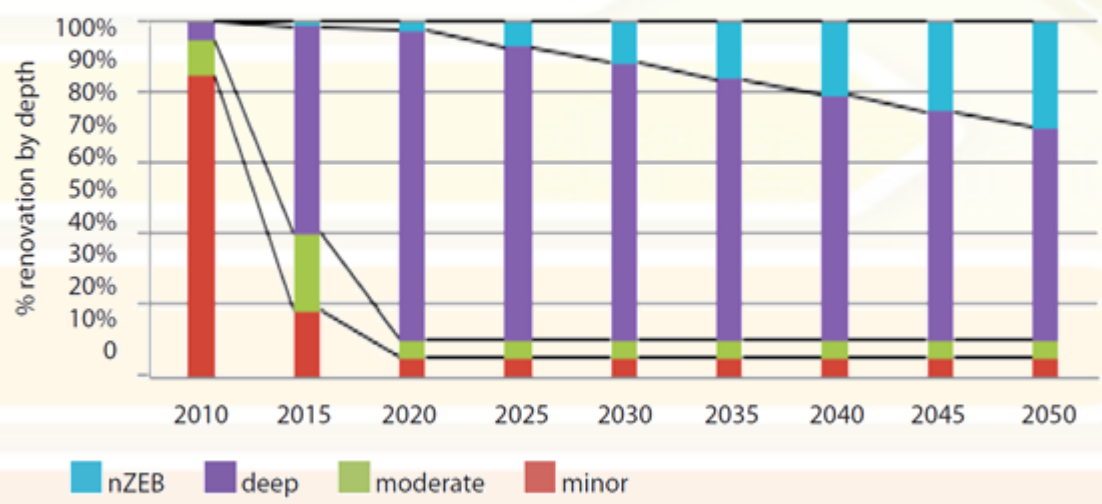
	<b>I</b> <i>Predškolsko obrazovanje</i>	<b>II</b> <i>Obrazovanje</i>	<b>III</b> <i>Zdravstvo</i>	<b>IV</b> <i>Sport</i>	<b>V</b> <i>Kultura</i>	<b>VI</b> <i>Kancelarijske zgrade</i>	<b>VII</b> <i>Zgrade za cjelodnevni boravak</i>
<b>A</b> <i>Do 1945. godine</i>							
<b>B</b> <i>Od 1946 do 1965. god.</i>							
<b>C</b> <i>Od 1966 do 1973. god.</i>							
<b>D</b> <i>Od 1974 do 1987. god.</i>							
<b>E</b> <i>Od 1988 do 2009. god.</i>							
<b>F</b> <i>Posle 2010. god.</i>							





## Renovation strategy

**Figure 8 – Required increase in renovation depth to achieve 90% CO<sub>2</sub> saving** (Source – BPIE model)



**Figure 6 – Main types of barrier encountered in building renovation** (Adapted from BPIE <sup>14</sup>)



# THANK YOU!

Goran Krstović  
Project Leader  
Promotion of Energy Efficiency in Bosnia and Herzegovina  
Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH  
Ferhadija 19/II  
71000 Sarajevo  
Bosnia and Herzegovina  
T +387 (0) 33 204-895  
F +387 (0) 33 209-858  
M +387 (0) 61 174-091  
E [goran.krstovic@giz.de](mailto:goran.krstovic@giz.de)  
I [www.giz.de](http://www.giz.de)