

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



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## 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)**

### **Developing national energy performance requirements for buildings**

The process of regulating the technical standards for the design of thermal insulation of buildings, the technical installations of buildings and the characteristics of building materials used can be traced back to the early 1960s. Up to 1999 the energy requirements for buildings were constantly improved and updated. In 2004 the ZEE and its secondary legislation on energy efficiency transposed Directive 2002/91/EU on the energy performance of buildings and marked a new approach in the development of national requirements by defining integrated energy characteristics and treating buildings as integrated systems in which energy use is the result of the interaction of the following main elements:

- building envelopes;
- microclimate parameter maintenance systems;
- external heat sources;
- inhabitants;
- climatic conditions.

The reference values (from the legislative acts current at the time the building is put into operation) of heat engineering indicators for building envelopes, and the efficiency of the building's features and plants for heating, cooling, ventilation and water heating systems, are taken into account when existing buildings are surveyed and certified, and when their energy performance is calculated.

### **Development of the Construction Sector**

The construction sector in Bulgaria has a particularly important role to play in overcoming the effects of global climate change by adopting measures to increase energy efficiency by defining the quality of the living and working environment. The construction sector has a defining role in the Bulgarian economy and accounts for almost 7 % of the GDP of the country and employs over 5.5 % of the economically active population. Over 40 % of investments in fixed assets are in the construction sector. This sector is also a determining factor when it comes to national competitiveness and attracting foreign investments. At the same time it is highly fragmented, with micro- and small enterprises accounting for over 96 % of construction enterprises. Construction in Bulgaria is among the sectors most hardly hit by the world economic crisis. National statistics show that the volume of construction has almost halved, from BGN 21 billion in 2008 to BGN 11 billion in 2011, with an overall decline of 47 % in the industry compared with the pre-crisis years. The first half of 2012 showed a shrinking of the market, the main microeconomic indicators being: formation of 6.5 % of the gross added value, providing a mere 184 000 jobs (compared with 297 000 in 2008 and 203 000 in 2011); a 7.5 % reduction in completions compared with 2011; negligible growth of 0.1 % in building construction; and a decline of 15.7 % in engineering construction compared with the first half of 2011.

The Operational Program 'Development of the Competitiveness of the Bulgarian Economy' (2007—13) is being deployed to increase the competitiveness of construction enterprises and to ensure favorable investment conditions in Bulgaria, with some of the procedures under the Program being used to promote measures to use energy-efficient technologies, renewable energy sources, innovations, the renewal of manufacturing and office buildings, etc.

## **Housing construction**

Households are the third largest consumers of energy, with a practically constant level of consumption of around 2.1—2.2 Mtoe yearly. The sector share has also remained constant, at about 25—26 % of energy end consumption. The consumption of energy in housing increased from 0.553 toe/unit in 2007 to 0.567 toe/unit in 2009, with electricity consumption rising particularly quickly. The main factors in this increased energy consumption are: the larger size of new housing units; increased heat comfort levels and lighting; the penetration of air conditioning use, and the rising use of electrical appliances and electronic equipment. Issues as yet unresolved in domestic residences are the low efficiencies of wood and coal-burning stoves and chimneys, and the lack of domestic gasification. The problem of the energy efficiency of housing is growing: on the one hand, the price of fuels places a heavy burden on household budgets, while on the other hand there is a global push to save energy in order to achieve sustainable development, as heating accounts for around 70 percent of domestic energy consumption.

A priority of the National Program to renovate residential buildings in Bulgaria 2006—20 is multi-occupancy buildings. The expected average energy savings that would result when the energy efficiency measures are implemented would be 25—35 kWh/m<sup>2</sup> of floor space per annum. The anticipated effect of the package of measures, taking into account the contribution of replacing sub-distribution stations, is around 35.5 % savings on the pre-renovation costs, taking into account the requirements for maintaining the standard domestic microclimate parameters.

Despite the fact that Bulgaria's housing stock is comparatively modern (about half of all buildings have been built in the last 40 years and only 3.9 % date from before 1919), the condition of these buildings is poor and constantly deteriorating, primarily due to inadequate maintenance and poor management by the owners.

## **Public buildings**

There are over 17 000 public buildings in Bulgaria, which illustrates the importance of implementing measures to reduce consumption in them. Because the public sector should set the trend in energy efficiency measures, the ZEE introduced mandatory certification for buildings with a floor space of more than 1000 m<sup>2</sup> and individual energy savings targets to be met. As a result, in 2005—11 3788 buildings were surveyed. Therefore the Bulgarian public sector clearly needs to lead the process of implementing the requirements of Directive 2010/31/EU.

In accordance with the European Commission's new Energy Efficiency Plan of 2011, the national strategic documents envisage public buildings reducing their energy consumption by implementing consumption-reducing measures through repair and renovation works. The best-case forecast for fulfilling the national interim target by 2015 can be defined as between 1—1.5 % of the total floor area of new central and local government buildings, using 2012 as the selected base year. The base year was chosen on account that two years after significant revision of legislation regarding energy efficiency (the new 2008 Energy

efficiency Act and the 2009 secondary implementing legislation), old buildings have been repaired and new buildings put into operation that had been designed and implemented in accordance with the new (current) energy efficiency and annual energy consumption standards. Achieving better energy performance, for example almost zero-energy buildings, should properly be compared with the base year when the harmonized minimum standard requirements, i.e.  $EP_{max, r}$  in kWh/m<sup>2</sup> were implemented. After the plan's impact has been assessed the national target, including the interim target, can be adjusted.

## 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.**

For reporting the detailed application in practice of the definition of nearly zero-energy buildings, the table presented in the Annex is to be used.

If a national definition of nearly zero-energy buildings does not exist yet in your country, please indicate here whether precise plans are already under development and if so, please describe these plans. Please also describe if any currently used non-governmental definitions will be considered in these plans and/or a future directive.

The draft national definition of nearly zero-energy buildings in Bulgaria has been defined in accordance with the underlying principles of the correct formulation of the definition of nearly zero-energy buildings extrapolated at European level and takes into account its characteristics for clearly defined targets and conditions, of technical and financial feasibility, flexibility and adaptability to local climatic conditions, of promoting innovative technologies, etc. (Principles for nearly Zero-Energy Buildings — published in 2011 by Buildings Performance Institute Europe).

The definition is structured around three basic requirements:

- Primary energy consumption conforming with class A on the national scale. Under the current requirements, class A energy consumption is less than 1/2 of class B, with the latter regulating the mandatory requirement for making new buildings operational.
- Minimum share of renewables in the building's energy balance.
- Restriction of the maximum share of electricity in the building's total energy balance. This restriction applies only to buildings with a total floor space in excess of 500 m<sup>2</sup>.

Taking into account the characteristics of individual types, buildings are sorted into the following three main groups:

BUILDING GROUPS	REQUIREMENTS FOR MEETING NEARLY ZERO-EMISSIONS STANDARDS
<b>GROUP A:</b> Single and multi-occupancy residential buildings with a floor area of up to 500 m <sup>2</sup>	<ol style="list-style-type: none"> <li>1. To achieve class A primary energy consumption, whereby:</li> <li>2. At least 50 % of the energy needed for heating, hot water, ventilation and cooling is from renewables.</li> </ol>
<b>GROUP B:</b> Buildings with a floor space of 500 to 7 000 m <sup>2</sup> : - residential buildings, halls of residence, rest houses, multi-function buildings, public buildings for education, and science, culture, social services, administration, commerce, public catering and hotels, buildings for domestic services, public service buildings for transport and electronic communications, sports, ceremonial buildings, congress and conference centres, and health establishments.	<ol style="list-style-type: none"> <li>1. To achieve class A primary energy consumption, whereby:</li> <li>2. At least 30 % of the energy needed for heating, hot water, ventilation and cooling is from renewables.</li> <li>3. The share of electricity in the building's annual primary energy consumption balance (including electricity for the heating, hot water, ventilation and cooling systems) is no more than 30 %.</li> </ol>
<b>GROUP C:</b> Buildings with a floor space of more than 7 000 m <sup>2</sup> : - residential buildings, halls of residence, rest houses, multi-function buildings, public buildings for education and science, culture, social services, administration, commerce, public catering and hotels, buildings for domestic services, public service buildings for transport and electronic communications, sports, ceremonial buildings, congress and conference centres, and health establishments.	<ol style="list-style-type: none"> <li>1. To achieve class A primary energy consumption, whereby:</li> <li>2. At least 20 % of the energy needed for heating, hot water, ventilation and cooling is from renewables.</li> <li>3. The share of electricity in the building's annual primary energy consumption balance (including electricity for the heating, hot water, ventilation and cooling systems) is no more than 40 %.</li> </ol>

To calculate the energy consumption indicators and the energy performance of a building, the following classifications are used:

- residential, including individual houses; low, medium and high-rise residential buildings (blocks of flats); mixed;
- non-residential, including administrative buildings (administrative, office, ceremonial buildings, etc.); educational buildings (schools, kindergartens, etc.); health care buildings (various health establishments, etc.); hotel and services buildings (hotels, motels, halls of residence, etc.); commercial buildings (shopping centers, markets and arcades, shops, etc.); public catering establishments (catering outlets, restaurants, etc.); sports buildings; and other public use buildings (buildings for culture and the arts, transport buildings, etc.).

The purpose of energy performance calculations is to determine: the consumption, energy economy and heat insulation of buildings; to determine the level of energy efficiency; to assess the compliance of every proposed investment project design; and to issue an energy certificate and a building certificate. The national methodology for calculating energy consumption and energy performance is based on Bulgarian standard BDS 180 13790 and good European practice in calculating the annual energy consumption for heating, cooling and hot water. The unified methodology for establishing energy consumption indicators and determining energy performance of buildings was updated in 2010 and includes:

1. the orientation, dimensions and shape of the building;
2. the characteristics of the building envelopes and internal spaces, including thermal and
  1. optical characteristics, air tightness, humidity resistance and resistance to water ingress;
  2. domestic hot water heating systems;
  3. cooling systems;
  4. ventilation systems;
  5. lighting systems;
  6. passive solar systems and solar protection;
  7. natural ventilation;
  8. systems for using renewable sources of energy;
  9. external and internal climatic conditions.

The baseline values for climatic factors have been determined for nine climatic zones within Bulgaria.

The building energy consumption indicators have been classified into three main groups:

- group one: indicators to characterize the energy converting and transmitting properties of building envelopes and elements of the microclimate maintenance system;
- group two: indicators characterizing the energy consumption of technological processes for heating, cooling, ventilation and domestic hot water;
- group three: indicators characterizing the energy consumption of the building as a whole.

The rules for setting up a scale of energy consumption classes and for classifying a particular building to a particular class from A to G on the energy scale are normatively determined. The scale of energy consumption classes is based on two integrated energy performance values: EP<sub>max, g</sub> and EP<sub>max, s</sub>, defined as the primary energy or as the energy demand (supplied), or saved carbon dioxide emissions, as follows:



1. EP<sub>max, g</sub> is the total specific energy consumed for heating, cooling, ventilation, hot water and lighting calculated in accordance with the National Methodology; the thermal engineering values of the building envelope and elements, and the efficiency of elements and plants of the heating, cooling, ventilation and domestic water heating systems, conform with current legislative acts at the time of the assessment;

2. EP<sub>max, s</sub> is the total specific energy consumed for heating, cooling, ventilation, hot water and lighting calculated in accordance with the National Methodology; the thermal engineering values of the building envelopes and elements, and the efficiency of heating, cooling, ventilation and domestic water heating system systems conform with legislative acts current in the year the building is put into operation.

The technical energy efficiency indicators when designing buildings and assessing the compliance of the designs with the energy efficiency requirements are as follows:

1. total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area ( $A_f$ ) in  $m^2$ , defined as the energy consumed and primary energy in the case of new buildings, where the outline plan/design agreement includes the design of a general heating installation for the whole building;
2. total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area ( $A_f$ ) in  $m^2$ , defined as the net energy in the case of new buildings where the outline plan requires local heating, or whose structures do not allow central heating with a common heating installation to be incorporated;
3. total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area ( $A_f$ ) in  $m^2$  or per cubic meter of heatable space ( $V_s$ ) in  $m^3$ , in terms of primary energy in the case of existing buildings with a rated temperature of the internal air above 15 °C and relative air humidity below 70 %.

The reference value for the building is determined in the methodology by substituting the reference values for the building envelope and the reference values for the indicators for the building microclimate maintenance systems and plants in the calculations. The 2009 building envelope reference values are the same as for both new and existing buildings.

A building is deemed to have met the energy efficiency requirements if:

1. for new buildings in the design or construction process, the calculated indicators conform with energy consumption class B;
2. for existing buildings, the calculated indicator values conform:
  - a) at least with class C of the energy consumption scale for buildings put into operation during the period 1991–2009 inclusive;
  - b) at least with class D of the energy consumption scale for buildings put into operation up to 1990 inclusive.

The national definition of nearly zero-energy buildings is elaborated by the Technical University – Sofia together with the estimations of the cost-optimal levels for technical requirements for energy characteristics of building in the framework of the BG161PO001/5-01/2008/076 “Analyses, studies and actualization of legal acts” project, financially supported by the operational program “Regional development 2007-2013”.

According to the definition the building has to correspond to both of the legal requirements set in figure below:

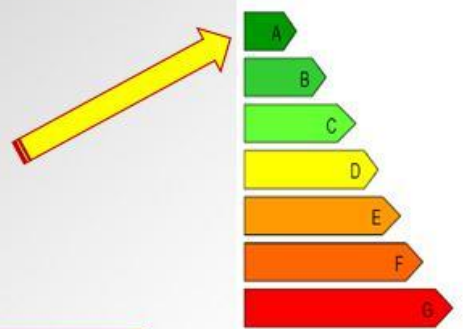


TECHNICAL UNIVERSITY  
- SOFIA

## The BG “nearly Zero-Energy Buildings” DEFINITION:

nZEB is a building with:

- **Primary energy consumption (including appliances) – class A.** (The national requirement for new buildings is energy class B)
- **At least 55% of the final energy (without appliances) covered by RES.**



Heating energy  
Cooling energy  
Electricity for lighting  
~~Electricity for appliances~~

The definition is tested in practice in the process of major renovation of building for education and science which is the Research and Development Complex of the Technical University – Sofia.

### 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

The ZEVI specifies that in the construction of new buildings or the reconstruction, major renovation, major repair or conversion of existing buildings, systems for generating energy from renewable sources shall be incorporated where technically feasible and financially viable: for public service buildings from 1 January 2012 and for other buildings from 31 December 2014. The possibility of using renewable energy forms part of the assessment of the annual energy consumption indicators for the building.

Requirements on fraction of renewable energies:

In these cases specified by ZEVI at least 15 percent of the total amount of heat and cooling energy needed for the building must be produced from renewable sources by implementing:

1. centralized heating using biomass or geothermal energy;
2. individual biomass incineration units with a conversion efficiency of at least 85 percent for residential and commercial buildings, and 70 percent for industrial buildings;
3. solar heating installations;
4. thermal pumps and surface geothermal systems.

Requirements on useful energy demand:

Requirements on primary energy demand:

#### 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.):

Period, years	Final energy consumption		
	Directive 2006/32/EC		Directive 2010/31/EU
	Energy saving target, GWh	Achieved (in 2010) and expected (in 2016) energy savings, GWh	Nearly zero-energy building target, %
2010	2430	3549	-
2013	4860	5892	-
2015	-		1÷1,5 *(est.)

2016	7291	-	
2020			100

\* Share of the total floor area of new buildings occupied by central and local government

#### 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.

In order to set the national definition for nearly zero-energy building and determine the technical requirements for the energy characteristics of buildings the Government of Republic of Bulgarian has started the implementation of BG161PO001/5-01/2008/076 "Analyses, studies and actualization of legal acts" project, financially supported by the operational program "Regional development 2007-2013".

The first phase of the project has already been implemented and thus there has been identified the next steps for revising the national legislation, including building codes in order to regulate the nearly zero-energy buildings requirements. As a result of the whole project implementation the National nearly zero-energy building Plan will be actualized in order to set the intermediate targets for such building and the mechanisms for their achievement.

## 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?

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

The ZEVI specifies that in the construction of new buildings or the reconstruction, major renovation, major repair or conversion of existing buildings, systems for generating energy from renewable sources shall be incorporated where technically feasible and financially viable: for public service buildings from 1 January 2012 and for other buildings from 31 December 2014. The possibility of using renewable energy forms part of the assessment of the annual energy consumption indicators for the building.

#### Requirements on fraction of renewable energies:

In these cases specified by ZEVI at least 15 percent of the total amount of heat and cooling energy needed for the building must be produced from renewable sources by implementing:

1. centralized heating using biomass or geothermal energy;
2. individual biomass incineration units with a conversion efficiency of at least 85 percent for residential and commercial buildings, and 70 percent for industrial buildings;
3. solar heating installations;
4. thermal pumps and surface geothermal systems.

#### Requirements on useful energy demand:

#### Requirements on primary energy demand:

### 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.):

Period, years	Final energy consumption		
	Directive 2006/32/EC		Directive 2010/31/EU
	Energy saving target, GWh	Achieved (in 2010) and expected (in 2016) energy savings, GWh	Nearly zero-energy building target, %

2010	2430	3549	-
2013	4860	5892	-
2015	-		1÷1,5 *(est.)
2016	7291	-	
2020			100

\* Share of the total floor area of new buildings occupied by central and local government

**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.

See p. 3.2.

## 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

The Bulgarian Energy Strategy by 2020 incorporates the government's vision of Bulgaria's European development, taking into account the current European energy policy framework and worldwide tendencies in the development of energy technologies. The Energy Strategy is the underlying document for national energy policy development. Approved by the Council of Ministers and passed by the National Assembly in 2011, its aim is a reliable, efficient and cleaner energy system. The main accents in sustainable energy development by 2020 are a 20 % improvement in energy efficiency, increasing the share of renewable sources to 16 % (20 %) of the energy end-use and a 20 % reduction in greenhouse gas emissions compared with 1990. The Bulgarian government therefore will focus on improving efficiency in the generation of electricity and heat, reducing transmission and distribution losses, improving the energy performance of existing buildings and introducing more stringent energy standards for new buildings, including energy-independent buildings.

The national renewable energy action plan and the Second National Energy Efficiency Action Plan (Second National Plan)(based on Directive 2006/32/EC on energy end-use efficiency and energy services and covering the period 2011–6 and the forecast to 2020) Implementing the Second National Action Plan will help to meet the National Energy Savings Target (in 2016) of 7291 GWh per annum and constituting 9 % of the mean energy end-use for the period 2001–5 (81 024 GWh). The provisional indicative target for the period 2011–3 (in 2013) is 6 % of the average energy-end use value for the period 2001–5.

One sub-target of the Second National Action Plan is a National Target for nearly-zero energy buildings. A Strategy to increase the number of these buildings in accordance with Directive 2010/31/EU has been proposed by:

- assisting the construction of new nearly zero-energy buildings and achievement of the same energy characteristics when existing buildings undergo major refurbishment;
- analyzing and revising existing national legislation, documents and measures to support the implementation of Directive 2010/31/EU;
- analyzing the state of the construction sector (growth of the construction process, business environment, financial and administrative obstacles, socio-economic conditions, market principles, etc);
- regulating the introduction of renewables in the construction of new buildings or the reconstruction, major refurbishment, major repair or conversion of existing buildings;
- fine-tuning the powers and functions of the competent authorities arising from the implementation of the new requirements of Directive 2010/31/EU with regard to the building sector (public and residential buildings);
- planning measures for the period 2012–3 to assign and implement applied research tasks to determine national parameters and requirements for the energy performance of nearly zero-energy buildings; supplementing the national calculation methodology with new elements from the relevant European standards for designing sustainable and smart buildings, taking into account standards for passive buildings and the level of technologies for heating, cooling and ventilation systems using conventional or renewable energy; systematic analysis of data in the information system of the Sustainable Energy Development Agency (AUER) regarding the state of energy use in existing buildings; and preparing projects, approving and publishing legislation, by-laws and administrative regulations;
- planning measures in the period 2012–3; defining the national targets, implementation mechanisms, activities related to recording, documenting and reporting results; pilot projects for new public-sector nearly zero-energy buildings for 2011–3; an approximate definition of the provisional target for 2015 of 1–1.5 % of the total floor space of new buildings occupied



by central or local government departments with an energy performance corresponding to nearly zero-energy use; drafting a National Plan to increase the number of nearly zero-energy buildings;

- adapting the National Program for housing renovation in Bulgaria for 2006–20 in order to comply with the EU's harmonized energy efficiency policy and the government's new policy for large-scale renovation of multi-occupancy residential buildings
- schemes to provide financial aid under the Operational Program Regional Development (Supporting energy efficiency in multi-occupancy residential buildings);
- priority for the renovation of concrete panel and other multi-occupancy buildings, and linking this process with the necessary energy certification and energy surveying of buildings;
- drawing up a pilot program for nearly zero-energy public buildings;
- harmonizing a package of legislation and regulations in accordance with the 2010 Energy Performance of Buildings directive by supplementing national legislative requirements with regards to the thermal transmittance (U value, W/m<sup>2</sup>K) of walls and glazed apertures, and building features, taking into account developments in the manufacture of building materials and products (Regulation No 7 of 2004 on energy efficiency, thermal insulation and energy economy in buildings, as amended in 2010, and Regulation No RD-16-1058 of 2009 on energy use indicators and the energy performance of buildings; and Regulation No 15 on the technical rules and standards for the design, construction and operation of buildings and facilities for the production, transmission and distribution of heat energy);
- stimulating the establishment of owners' associations within the meaning of the Condominium Management Act (ZUES) and assistance with surveys of condominiums.

National legislation in the field of energy efficiency includes: The Energy Efficiency Act (ZEE); the Territorial Planning Act (ZUT); the Energy Act (ZE); the Renewable Energy Act (ZEVI); the Technical Requirements for Products Act (ZTIP); the National Standards Act (ZNS); and others. The main by-laws determining the technical level of energy consumption in buildings and establishing the legal and technical basis for energy efficiency requirements are as follows:

On the basis of the ZUT:

- Regulation No 7 of 2004 on energy efficiency, heat insulation and energy savings in buildings;
- Regulation No 5 of 2006 on technical certificates of buildings.

On the basis of the ZEE:

- Regulation No RD-16-1057 of 2009 on the conditions and procedure for energy efficiency surveys and certifying buildings, issuing energy performance certificates and certificate categories;
- Regulation No RD-16-1058 of 2009 on energy consumption and building energy performance indicators;
- Regulation No RD-16-348 of 2009 on circumstances subject to entry in the register of persons carrying out building certification and energy surveys, qualification methods and conditions and equipment needed for surveying and certifying buildings;
- Regulation No RD-16-932 of 2009 on the conditions and procedures for checking the energy efficiency of boilers and air-conditioning installations, pursuant to Article 27(1) and 28(1) of the ZEE and for setting up, maintaining and using a database thereof.

On the basis of the ZE:

- Regulation No 15 of 2005 on the technical rules and standards for designing, building and operating buildings and facilities for thermal energy production, transmission and distribution, and the methodologies for the implementation thereof.

On the basis of the ZTIP:

The Regulation on the main requirements for buildings and assessing the conformity of building products, adopted by Decree No 325 of the Council of Ministers of 2006 (SG No 106 of 2006). Article 169 of the ZUT (Directive 89/106/EEC and Regulation (EU) No 305/2011) implement the following substantial requirements for buildings: structural integrity stability and durability of building constructions and the underlying ground when subjected to operating and seismic stress; fire safety; protecting human health and safety and property; the safe use of buildings;



environment protection; energy efficiency; thermal insulation and economy of thermal energy; and the sustainable use of natural resources. The ZUT defines the main players in construction, the relations between them, their obligations and responsibilities, and their obligation to check and certify that energy efficiency requirements have been met by evaluating completed investment plans for compliance and supervising works in accordance with the approved investment plans. The ZUT regulates the requirements and procedure for obtaining building permits and for putting completed buildings into operation. The regulations on building energy characteristics and on energy efficiency, thermal insulation and energy savings in buildings are implemented in a uniform manner and constitute the legislative basis for planning, designing, surveying and certifying buildings.

Each investment project for a new building or for the refurbishment, major renovation or conversion of an existing building requiring planning permission under the ZUT must contain a section on Energy Efficiency and, in accordance with the ZEE for new buildings with a floor space of over

1000 m<sup>2</sup>, Investment projects must take into account the options of using (Article 8 of Directive 31/2010/EC):

1. decentralized systems for the generation and consumption of renewable energy sources;
2. installations for heat and electricity cogeneration;
3. central or local heating and cooling installations;
4. thermal pumps.

The ZEVI specifies that in the construction of new buildings or the reconstruction, major renovation, major repair or conversion of existing buildings, systems for generating energy from renewable sources shall be incorporated where technically feasible and financially viable: for public service buildings from 1 January 2012 and for other buildings from 31 December 2014. The possibility of using renewable energy forms part of the assessment of the annual energy consumption indicators for the building.

An Act amending and supplementing the ZEE has been drawn up in connection with transposing requirements of Directive 2010/31/EU. The main aim of the draft is to make a significant contribution towards achieving Bulgaria's aims in energy efficiency, reducing energy consumption and promoting the improvement of the energy performance of buildings. Bulgaria will strive to provide support to construct new nearly zero-energy buildings and to improve energy performance when renovating existing buildings.

The draft Act amending and supplementing the ZEE aims to:

- supplement the energy savings measures recommended each time a building, or parts thereof which are in use, are reconstructed, undergo major repair or renovation, with a technical and economic feasibility assessment for using alternative systems and installations (Article 7 of Directive 31/2010/EU);
- improving the energy performance of buildings in use after reconstruction, major repairs or major renovation of the building, or of the repaired part thereof, so that they conform with the minimum energy efficiency requirements insofar as it is technical feasible and economically viable;
- introducing requirements into the National Plan to increase the number of nearly zero-energy buildings; a national definition of and technical indicators for near zero-energy buildings, reflecting national conditions; the duration of the plan; national targets for increasing the number of near zero-energy buildings based on the classification of building types; policies and mechanisms, including financial mechanisms, to promote the construction of near zero-energy buildings, and institutions responsible for drafting and approving the National Plan.

### 5.1.2 Relevant economic incentives and financing instruments

Bulgarian government mobilizes different instruments for stimulation and financing of measures for energy efficiency improvement in residential buildings:

- Residential EE credit lines – the beneficiaries are private bodies and associations, the realized projects are 36 300;
- Operational Program “Regional Development” redirected 40 million Euro to support of energy efficiency and RES measures in the municipal educational infrastructure and 13.9 million Euro to energy efficiency and RES measures in the municipal in educational infrastructure, owned by municipalities outside the city agglomerations.
- National Program for renovation of the residential buildings has multi-family residential buildings as a priority, envisaging the renovation of around 700 000 dwellings over the period 2006–2020. The state supports the panel dwelling owners by means of direct subsidy of 20% from the renovation total.
- National Strategy for financing the building insulation for energy efficiency (2006–2020) grants a subsidy for measure implementation, audits and certification to state owned buildings, municipal owned buildings and private multi-family residential panel buildings.
- Local Taxes and Fees Act has a provision for building tax exemption for the owners of buildings, linking the duration exemption to energy performance of the building – for buildings with class C (if built before 1990) or class B (if built before 2005): 7 years (10 years if RES are used), for buildings with class D (if built before 1990) or class C (if built before 2005): 3 years (5 years if RES are used).

The financial mechanisms supporting the construction of new and major renovation of existing building to become nearly zero-energy buildings will be determined in the Long-term program for mobilizing investment in the renovation of the national stock which will be developed according to the requirements of the 2012/27/EC Directive.

### 5.1.3 Energy performance certificates’ use and layout in relation to nZEB standard

- Energy Performance Certificate (EPC): issued by energy auditors after accomplishment of energy efficiency audits;
- Requirement for EPC as legal document in case of purchase, sale or lease of buildings

The recent amendments in the Energy performance certificates’ layout has been made in order to indicate whether the building is nearly zero-energy and also the share of renewable energy used.

### 5.1.4 Supervision (energy advice and audits)

Possibility for energy audits.

### 5.1.5 Information (tools)

Advertising campaigns on financial mechanisms and grants to encourage the implementation of energy-saving measures in buildings are launched continuously. The media regularly carry out advertising campaigns. AUER publishes informational material in its webpage, and distributes brochures to promote the implementation of energy efficiency measures and the use of renewable energy.

The ‘Management of energy efficiency and renewable energy’ seminars are a part of the AUER’s information campaign, organized in 2012 for economic planning in six regions. Bulgaria developed and introduced measures for the transparency and reputation improvement of the work of AUER. The project was financed by the European Social Fund and the Bulgarian state budget, through the Operational Program Administrative Capacity. The main aim of the project was to guarantee transparency and honesty in the AUER activities. Some of its specific aims are:



- establishing publicity and access to information for citizens and business representatives on the administrative activities and services provided by AUER;
- improving protection against possible opportunities for corruption;
- increasing the public confidence in AUER, and encouraging the active participation of the public in the decision processes and the control on issues connected with the energy efficiency.

The National information system for energy efficiency maintains registers and databases, providing information on the energy efficiency status in the country. The databases contain information on all certificates issued for buildings. This is available through the AUER webpage.

#### 5.1.6 Demonstration

Completed projects and construction to support improvement of the investment climate and improve the energy efficiency of residential and public buildings under OP 'Regional Development' 2007–13.

During this period, and particularly in the last few years, a large number of projects to increase building energy efficiency have been completed under more than 15 of the Program's schemes: access to sustainable and efficient energy resources; energy renewal of Bulgarian homes; support for integrated urban renewal and development plans; a green and accessible urban environment; support for energy efficiency in multi-occupancy residential buildings; support for energy efficiency measures in municipal educational infrastructure in urban conglomerations; support for energy efficiency measures in the municipal educational infrastructure of 178 small municipalities; and others.

#### 5.1.7 Education and training

The scope of the examination material, as well as the evaluation procedure, are standard throughout the country. These are prepared by technical high-schools, are accredited and coordinated by the Executive Director of the AUER, and approved by the Minister of Economy and Energy.

At the end of the training course, the QE/inspectors have to pass a two-part final exam: an individual test and a presentation of a team project. The final exam is conducted by an examination board. The experts who pass the exam are registered in the database of the AUER Information System for a period of 3 years. After this period, the experts must undertake and pass a new exam, in order to maintain the status of QE.

## 5.2 Non-residential buildings

#### 5.2.1 Relevant regulations

The Bulgarian Energy Strategy by 2020 incorporates the government's vision of Bulgaria's European development, taking into account the current European energy policy framework and worldwide tendencies in the development of energy technologies. The Energy Strategy is the underlying document for national energy policy development. Approved by the Council of Ministers and passed by the National Assembly in 2011, its aim is a reliable, efficient and cleaner energy system. The main accents in sustainable energy development by 2020 are a 20 % improvement in energy efficiency, increasing the share of renewable sources to 16 % (20 %) of the energy end-use and a 20 % reduction in greenhouse gas emissions compared with 1990. The Bulgarian government therefore will focus on improving efficiency in the generation of electricity and heat, reducing transmission and distribution losses, improving the energy performance of existing buildings and introducing more stringent energy standards for new buildings, including energy-independent buildings.

The national renewable energy action plan and the Second National Energy Efficiency Action Plan (Second National Plan)(based on Directive 2006/32/EC on energy end-use efficiency and energy services and covering the period 2011–6 and the forecast to 2020) Implementing the Second National Action Plan will help to meet the National Energy Savings Target (in 2016) of 7291 GWh per annum and constituting 9 % of the mean energy end-use for the period 2001–5 (81 024 GWh). The provisional indicative target for the period 2011–3 (in 2013) is 6 % of the average energy-end use value for the period 2001–5.

One sub-target of the Second National Action Plan is a National Target for nearly-zero energy buildings. A Strategy to increase the number of these buildings in accordance with Directive 2010/31/EU has been proposed by:

- assisting the construction of new nearly zero-energy buildings and achievement of the same energy characteristics when existing buildings undergo major refurbishment;
- analyzing and revising existing national legislation, documents and measures to support the implementation of Directive 2010/31/EU;
- analyzing the state of the construction sector (growth of the construction process, business

environment, financial and administrative obstacles, socio-economic conditions, market principles, etc);

- regulating the introduction of renewables in the construction of new buildings or the reconstruction, major refurbishment, major repair or conversion of existing buildings;
- fine-tuning the powers and functions of the competent authorities arising from the implementation of the new requirements of Directive 2010/31/EU with regard to the building sector (public and residential buildings);
- planning measures for the period 2012–3 to assign and implement applied research tasks to determine national parameters and requirements for the energy performance of nearly zero-energy buildings; supplementing the national calculation methodology with new elements from the relevant European standards for designing sustainable and smart buildings, taking into account standards for passive buildings and the level of technologies for heating, cooling and ventilation systems using conventional or renewable energy; systematic analysis of data in the information system of the Sustainable Energy Development Agency (AUER) regarding the state of energy use in existing buildings; and preparing projects, approving and publishing legislation, by-laws and administrative regulations;
- planning measures in the period 2012–3; defining the national targets, implementation mechanisms, activities related to recording, documenting and reporting results; pilot projects for new public-sector nearly zero-energy buildings for 2011–3; an approximate definition of the provisional target for 2015 of 1–1.5 % of the total floor space of new buildings occupied by central or local government departments with an energy performance corresponding to nearly zero-energy use; drafting a National Plan to increase the number of nearly zero-energy buildings;
- adapting the National Program for housing renovation in Bulgaria for 2006–20 in order to comply with the EU's harmonized energy efficiency policy and the government's new policy for large-scale renovation of multi-occupancy residential buildings
- schemes to provide financial aid under the Operational Program Regional Development (Supporting energy efficiency in multi-occupancy residential buildings);
- priority for the renovation of concrete panel and other multi-occupancy buildings, and linking this process with the necessary energy certification and energy surveying of buildings;
- drawing up a pilot Program for nearly zero-energy public buildings;
- harmonizing a package of legislation and regulations in accordance with the 2010 Energy Performance of Buildings directive by supplementing national legislative requirements with regards to the thermal transmittance (U value, W/m<sup>2</sup>K) of walls and glazed apertures, and building features, taking into account developments in the manufacture of building materials and products (Regulation No 7 of 2004 on energy efficiency, thermal insulation and energy economy in buildings, as amended in 2010, and Regulation No RD-16-1058 of 2009 on energy use indicators and the energy performance of buildings; and Regulation No 15 on the technical rules and standards for the design, construction and operation of buildings and facilities for the production, transmission and distribution of heat energy);
- stimulating the establishment of owners' associations within the meaning of the Condominium Management Act (ZUES) and assistance with surveys of condominiums.

National legislation in the field of energy efficiency includes: The Energy Efficiency Act (ZEE); the Territorial Planning Act (ZUT); the Energy Act (ZE); the Renewable Energy Act (ZEVI); the Technical Requirements for Products Act (ZTIP); the National Standards Act (ZNS); and others. The main by-laws determining the technical level of energy consumption in buildings and establishing the legal and technical basis for energy efficiency requirements are as follows:

On the basis of the ZUT:

- Regulation No 7 of 2004 on energy efficiency, heat insulation and energy savings in buildings;
- Regulation No 5 of 2006 on technical certificates of buildings.

On the basis of the ZEE:

- Regulation No RD-16-1057 of 2009 on the conditions and procedure for energy efficiency surveys and certifying buildings, issuing energy performance certificates and certificate categories;
- Regulation No RD-16-1058 of 2009 on energy consumption and building energy performance

indicators;

- Regulation No RD-16-348 of 2009 on circumstances subject to entry in the register of persons carrying out building certification and energy surveys, qualification methods and conditions and equipment needed for surveying and certifying buildings;
- Regulation No RD-16-932 of 2009 on the conditions and procedures for checking the energy efficiency of boilers and air-conditioning installations, pursuant to Article 27(1) and 28(1) of the ZEE and for setting up, maintaining and using a database thereof.

On the basis of the ZE:

- Regulation No 15 of 2005 on the technical rules and standards for designing, building and operating buildings and facilities for thermal energy production, transmission and distribution, and the methodologies for the implementation thereof,

On the basis of the ZTIP:

The Regulation on the main requirements for buildings and assessing the conformity of building products, adopted by Decree No 325 of the Council of Ministers of 2006 (SG No 106 of 2006). Article 169 of the ZUT (Directive 89/106/EEC and Regulation (EU) No 305/2011) implement the following substantial requirements for buildings: structural integrity stability and durability of building constructions and the underlying ground when subjected to operating and seismic stress; fire safety; protecting human health and safety and property; the safe use of buildings; environment protection; energy efficiency; thermal insulation and economy of thermal energy; and the sustainable use of natural resources. The ZUT defines the main players in construction, the relations between them, their obligations and responsibilities, and their obligation to check and certify that energy efficiency requirements have been met by evaluating completed investment plans for compliance and supervising works in accordance with the approved investment plans. The ZUT regulates the requirements and procedure for obtaining building permits and for putting completed buildings into operation. The regulations on building energy characteristics and on energy efficiency, thermal insulation and energy savings in buildings are implemented in a uniform manner and constitute the legislative basis for planning, designing, surveying and certifying buildings.

### 5.2.2 Relevant economic incentives and financing instruments

Bulgarian government mobilizes different instruments for stimulation and financing of measures for energy efficiency improvement:

- Energy Efficiency and Renewable Sources Fund (EERSF) – the total number of realized projects from municipalities, corporate and other clients is 143, valued 30 M EUR of which 20.4 M EUR credits.
- Bulgarian EE and RE credit line – the beneficiaries are enterprises with 209 realized projects, valued 198.5 M EUR of which 119.4 credits and 29.8 – grant;
- International Fund "Kozloduy" – beneficiaries are municipalities and the received grant is 27.9 M EUR for refurbishment and 10.8 M EUR for street lighting change;
- Operational Program "Development of the Competitiveness of the Bulgarian Economy" – the funds are for improvement of energy efficiency of large enterprises. The contracts are 30 valued to 78.9 M EUR, 50 % of which – grants;
- Operational Program "Regional Development" redirected 40 million Euro to support of energy efficiency and RES measures in the municipal educational infrastructure and 13.9 million Euro to energy efficiency and RES measures in the municipal in educational infrastructure, owned by municipalities outside the city agglomerations.
- National Strategy for financing the building insulation for energy efficiency (2006-2020) grants a subsidy for measure implementation, audits and certification to state owned buildings, municipal owned buildings and private multi-family residential panel buildings.
- Local Taxes and Fees Act has a provision for building tax exemption for the owners of buildings, linking the duration exemption to energy performance of the building – for buildings with class C (if built before 1990) or class B (if built before 2005): 7 years (10 years if RES are used), for buildings with class D (if built before 1990) or class C (if built before 2005): 3 years (5 years if RES are used).

The financial mechanisms supporting the construction of new and major renovation of existing building to become nearly zero-energy buildings will be determined in the Long-term program for mobilizing investment in the renovation of the national stock which will be developed according to the requirements of the 2012/27/EC Directive.

### 5.2.3 Energy performance certificates' use and layout in relation to nZEB standard

- Energy Performance Certificate (EPC): issued by energy auditors after accomplishment of energy efficiency audits;
- Requirement for EPC as legal document in case of purchase, sale or lease of buildings

The recent amendments in the Energy performance certificates' layout has been made in order to indicate whether the building is nearly zero-energy and also the share of renewable energy used.

### 5.2.4 Supervision (energy advice and audits)

- Mandatory energy audits of all public buildings with gross floor area more than 500 square meters;
- Mandatory boiler and air conditioning systems inspection.

### 5.2.5 Information (tools)

Advertising campaigns on financial mechanisms and grants to encourage the implementation of energy-saving measures in buildings are launched continuously. The media regularly carry out advertising campaigns. AUER publishes informational material in its webpage, and distributes



brochures to promote the implementation of energy efficiency measures and the use of renewable energy.

The 'Management of energy efficiency and renewable energy' seminars are a part of the AUER's information campaign, organized in 2012 for economic planning in six regions. Bulgaria developed and introduced measures for the transparency and reputation improvement of the work of AUER. The project was financed by the European Social Fund and the Bulgarian state budget, through the Operational Program Administrative Capacity. The main aim of the project was to guarantee transparency and honesty in the AUER activities. Some of its specific aims are:

- establishing publicity and access to information for citizens and business representatives on the administrative activities and services provided by AUER;
- improving protection against possible opportunities for corruption;
- increasing the public confidence in AUER, and encouraging the active participation of the public in the decision processes and the control on issues connected with the energy efficiency.

The National information system for energy efficiency maintains registers and databases, providing information on the energy efficiency status in the country. The databases contain information on all certificates issued for buildings. This is available through the AUER webpage.

#### 5.2.6 Demonstration

Completed projects and construction to support improvement of the investment climate and improve the energy efficiency of residential and public buildings under OP 'Regional Development' 2007–13.

During this period, and particularly in the last few years, a large number of projects to increase building energy efficiency have been completed under more than 15 of the Program's schemes:

access to sustainable and efficient energy resources; support for integrated urban renewal and development plans; a green and accessible urban environment; support for energy efficiency measures in municipal educational infrastructure in urban conglomerations; support for energy efficiency measures in the municipal educational infrastructure of 178 small municipalities; and others.

#### 5.2.7 Education and training

The scope of the examination material, as well as the evaluation procedure, are standard throughout the country. These are prepared by technical high-schools, are accredited and coordinated by the Executive Director of the AUER, and approved by the Minister of Economy and Energy.

At the end of the training course, the QE/inspectors have to pass a two-part final exam: an individual test and a presentation of a team project. The final exam is conducted by an examination board. The experts who pass the exam are registered in the database of the AUER Information System for a period of 3 years. After this period, the experts must undertake and pass a new exam, in order to maintain the status of QE.

**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?

There are some major challenges regarding the improvement of energy characteristics of residential buildings in Bulgaria and introduction of the requirement that all new buildings are nearly zero-energy buildings after 2020.

1. There are sufficient dwellings in Bulgaria. The value of number of dwellings per 1000 persons in Bulgaria is 532/1000 in comparison with the average for EU – 420/1000;
2. Every third dwelling in Bulgaria is uninhabited (1 220 416 dwellings), while 126 689 are overpopulated and 3 056 are primitive dwellings or there is a social need of 129 745



dwellings;

3. The main conclusion is that Bulgaria doesn't need new dwelling construction on a mass scale. The priority need is in three other directions:

- Renovation of the existing dwellings;
- Improvement the usage of the existing dwellings; and
- Ensuring social dwellings for the marginal social groups (through new construction or adapting the existing dwellings).

The main difficulties for the construction of nearly zero-energy buildings in Bulgaria is the possibility for integration of renewable energy sources installations because not all the territories are suitable, especially the urbanized with high density of the buildings.

## 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 –

See p.5

## 6.1 All new buildings occupied and owned by public authorities

### 6.1.1 Relevant regulations

The Bulgarian Energy Strategy by 2020 incorporates the government's vision of Bulgaria's European development, taking into account the current European energy policy framework and worldwide tendencies in the development of energy technologies. The Energy Strategy is the underlying document for national energy policy development. Approved by the Council of Ministers and passed by the National Assembly in 2011, its aim is a reliable, efficient and cleaner energy system. The main accents in sustainable energy development by 2020 are a 20 % improvement in energy efficiency, increasing the share of renewable sources to 16 % (20 %) of the energy end-use and a 20 % reduction in greenhouse gas emissions compared with 1990. The Bulgarian government therefore will focus on improving efficiency in the generation of electricity and heat, reducing transmission and distribution losses, improving the energy performance of existing buildings and introducing more stringent energy standards for new buildings, including energy-independent buildings.

The national renewable energy action plan and the Second National Energy Efficiency Action Plan (Second National Plan)(based on Directive 2006/32/EC on energy end-use efficiency and energy services and covering the period 2011–6 and the forecast to 2020) Implementing the Second National Action Plan will help to meet the National Energy Savings Target (in 2016) of 7291 GWh per annum and constituting 9 % of the mean energy end-use for the period 2001–5 (81 024 GWh). The provisional indicative target for the period 2011–3 (in 2013) is 6 % of the average energy-end use value for the period 2001–5.

One sub-target of the Second National Action Plan is a National Target for nearly-zero energy buildings. A Strategy to increase the number of these buildings in accordance with Directive 2010/31/EU has been proposed by:

- assisting the construction of new nearly zero-energy buildings and achievement of the same energy characteristics when existing buildings undergo major refurbishment;
- analyzing and revising existing national legislation, documents and measures to support the implementation of Directive 2010/31/EU;
- analyzing the state of the construction sector (growth of the construction process, business environment, financial and administrative obstacles, socio-economic conditions, market principles, etc.);
- regulating the introduction of renewables in the construction of new buildings or the reconstruction, major refurbishment, major repair or conversion of existing buildings;
- fine-tuning the powers and functions of the competent authorities arising from the implementation of the new requirements of Directive 2010/31/EU with regard to the building sector (public and residential buildings);
- planning measures for the period 2012–3 to assign and implement applied research tasks to determine national parameters and requirements for the energy performance of nearly zero-energy buildings; supplementing the national calculation methodology with new elements from the relevant European standards for designing sustainable and smart buildings, taking into account standards for passive buildings and the level of technologies for heating, cooling and ventilation systems using conventional or renewable energy; systematic analysis of data in the information system of the Sustainable Energy Development Agency (AUER) regarding the state of energy use in existing buildings; and preparing projects, approving and publishing legislation, by-laws and administrative regulations;
- planning measures in the period 2012–3; defining the national targets, implementation mechanisms, activities related to recording, documenting and reporting results; pilot projects for new public-sector nearly zero-energy buildings for 2011–3; an approximate definition of the provisional target for 2015 of 1–1.5 % of the total floor space of new buildings occupied by central or local government departments with an energy performance corresponding to nearly zero-energy use; drafting a National Plan to increase the number of nearly zero-energy buildings;
- adapting the National Program for housing renovation in Bulgaria for 2006–20 in order to comply with the EU's harmonized energy efficiency policy and the government's new policy for large-scale renovation of multi-occupancy residential buildings

- schemes to provide financial aid under the Operational Program Regional Development (Supporting energy efficiency in multi-occupancy residential buildings);
- priority for the renovation of concrete panel and other multi-occupancy buildings, and linking this process with the necessary energy certification and energy surveying of buildings;
- drawing up a pilot Program for nearly zero-energy public buildings;
- harmonizing a package of legislation and regulations in accordance with the 2010 Energy Performance of Buildings directive by supplementing national legislative requirements with regards to the thermal transmittance (U value, W/m<sup>2</sup>K) of walls and glazed apertures, and building features, taking into account developments in the manufacture of building materials and products (Regulation No 7 of 2004 on energy efficiency, thermal insulation and energy economy in buildings, as amended in 2010, and Regulation No RD-16-1058 of 2009 on energy use indicators and the energy performance of buildings; and Regulation No 15 on the technical rules and standards for the design, construction and operation of buildings and facilities for the production, transmission and distribution of heat energy);
- stimulating the establishment of owners' associations within the meaning of the Condominium Management Act (ZUES) and assistance with surveys of condominiums.

National legislation in the field of energy efficiency includes: The Energy Efficiency Act (ZEE); the Territorial Planning Act (ZUT); the Energy Act (ZE); the Renewable Energy Act (ZEVI); the Technical Requirements for Products Act (ZTIP); the National Standards Act (ZNS); and others. The main by-laws determining the technical level of energy consumption in buildings and establishing the legal and technical basis for energy efficiency requirements are as follows:

On the basis of the ZUT:

- Regulation No 7 of 2004 on energy efficiency, heat insulation and energy savings in buildings;
- Regulation No 5 of 2006 on technical certificates of buildings.

On the basis of the ZEE:

- Regulation No RD-16-1057 of 2009 on the conditions and procedure for energy efficiency surveys and certifying buildings, issuing energy performance certificates and certificate categories;
- Regulation No RD-16-1058 of 2009 on energy consumption and building energy performance indicators;
- Regulation No RD-16-348 of 2009 on circumstances subject to entry in the register of persons carrying out building certification and energy surveys, qualification methods and conditions and equipment needed for surveying and certifying buildings;
- Regulation No RD-16-932 of 2009 on the conditions and procedures for checking the energy efficiency of boilers and air-conditioning installations, pursuant to Article 27(1) and 28(1) of the ZEE and for setting up, maintaining and using a database thereof.

On the basis of the ZE:

- Regulation No 15 of 2005 on the technical rules and standards for designing, building and operating buildings and facilities for thermal energy production, transmission and distribution, and the methodologies for the implementation thereof,

On the basis of the ZTIP:

- The Regulation on the main requirements for buildings and assessing the conformity of building products, adopted by Decree No 325 of the Council of Ministers of 2006 (SG No 106 of 2006). Article 169 of the ZUT (Directive 89/106/EEC and Regulation (EU) No 305/2011) implement the following substantial requirements for buildings: structural integrity stability and durability of building constructions and the underlying ground when subjected to operating and seismic stress; fire safety; protecting human health and safety and property; the safe use of buildings; environment protection; energy efficiency; thermal insulation and economy of thermal energy; and the sustainable use of natural resources. The ZUT defines the main players in construction, the relations between them, their obligations and responsibilities, and their obligation to check and certify that energy efficiency requirements have been met by evaluating completed investment plans for compliance and supervising works in accordance with the approved investment plans. The ZUT regulates the requirements and procedure for

obtaining building permits and for putting completed buildings into operation. The regulations on building energy characteristics and on energy efficiency, thermal insulation and energy savings in buildings are implemented in a uniform manner and constitute the legislative basis for planning, designing, surveying and certifying buildings.

Each investment project for a new building or for the refurbishment, major renovation or conversion of an existing building requiring planning permission under the ZUT must contain a section on Energy Efficiency and, in accordance with the ZEE for new buildings with a floor space of over 1000 m<sup>2</sup>, Investment projects must take into account the options of using (Article 8 of Directive 31/2010/EC):

1. decentralized systems for the generation and consumption of renewable energy sources;
2. installations for heat and electricity cogeneration;
3. central or local heating and cooling installations;
4. thermal pumps.

The ZEVI specifies that in the construction of new buildings or the reconstruction, major renovation, major repair or conversion of existing buildings, systems for generating energy from renewable sources shall be incorporated where technically feasible and financially viable: for public service buildings from 1 January 2012 and for other buildings from 31 December 2014. The possibility of using renewable energy forms part of the assessment of the annual energy consumption indicators for the building.

An Act amending and supplementing the ZEE has been drawn up in connection with transposing requirements of Directive 2010/31/EU. The main aim of the draft is to make a significant contribution towards achieving Bulgaria's aims in energy efficiency, reducing energy consumption and promoting the improvement of the energy performance of buildings. Bulgaria will strive to provide support to construct new nearly zero-energy buildings and to improve energy performance when renovating existing buildings.

The draft Act amending and supplementing the ZEE aims to:

- supplement the energy savings measures recommended each time a building, or parts thereof which are in use, are reconstructed, undergo major repair or renovation, with a technical and economic feasibility assessment for using alternative systems and installations (Article 7 of Directive 31/2010/EU);
- improving the energy performance of buildings in use after reconstruction, major repairs or major renovation of the building, or of the repaired part thereof, so that they conform with the minimum energy efficiency requirements insofar as it is technical feasible and economically viable;
- introducing requirements into the National Plan to increase the number of nearly zero-energy buildings; a national definition of and technical indicators for near zero-energy buildings, reflecting national conditions; the duration of the plan; national targets for increasing the number of near zero-energy buildings based on the classification of building types; policies and mechanisms, including financial mechanisms, to promote the construction of near zero-energy buildings, and institutions responsible for drafting and approving the National Plan.

6.1.2 Relevant economic incentives and financing instruments
6.1.3 Energy performance certificates' use and layout in relation to nZEB standard
6.1.4 Supervision (energy advice and audits)
6.1.5 Information (tools)
<p>6.1.6 Demonstration</p> <p>Completed projects and construction to support improvement of the investment climate and improve the energy efficiency of residential and public buildings under OP 'Regional Development' 2007—13.</p> <p>During this period, and particularly in the last few years, a large number of projects to increase building energy efficiency have been completed under more than 15 of the Program's schemes:</p> <p>access to sustainable and efficient energy resources; support for integrated urban renewal and development plans; a green and accessible urban environment; support for energy efficiency measures in municipal educational infrastructure in urban conglomerations; support for energy efficiency measures in the municipal educational infrastructure of 178 small municipalities; and others.</p>
6.1.7 Education and training
<p><b>6.2</b> 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>

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

See p.5

## 7.1 Residential buildings

### 7.1.1 Relevant regulations

National Program to renovate residential buildings in Bulgaria 2006-20

Also see section 6&7 above.

In July 2012 Project BO161PO001-1.2.01-0001 'Energy renewal of Bulgarian homes' was launched with financial aid from Operational Program 'Regional Development' 2007–13, co-financed by the European Union through the European Regional Development Fund. The project covers 36 city centers and will last for three years (2012–5).

The project's overall aim is to provide better living conditions for residents of multi-occupancy buildings in city centers by improving the quality of the living environment and implementing energy efficiency measures. One particular project beneficiary is the Directorate of Housing Policy, a specialized administration within the MRRB.

The specific aims are to carry out energy efficiency measures in multi-occupancy buildings in 36 urban centers to:

- increase the energy efficiency of the buildings;
- to extend the physical and social lifespan of buildings by significantly increasing their functional qualities and the comfort of residents;
- create a living environment suitable for sustainable development. Buildings that qualify for the project are those containing six or more self-contained residential units on three or more floors.

### 7.1.2 Relevant economic incentives and financing instruments

The total amount of aid to be provided by OP 'Regional Development' under this project (Project BO161PO001-1.2.01-0001 'Energy renewal of Bulgarian homes') comes to BGN 50 million. The owners of multi-occupancy residential buildings are envisaged to receive financial aid equal to 50 % of the budget for renewing the building, with all the costs being covered to survey and determine the technical characteristics of the building, including the issue of a technical certificate, energy efficiency surveys and consultancy services by regional project managers in activities related to the establishment and registration of owners' associations, consultancy services regarding the implementation of the ZUES, for taking out credits to secure the financial share of the owners, etc.

The implementation of the renovation plans will be aided out of the Housing Renewal Fund. The anticipated results of the project are:

- energy efficiency upgrading construction works for a minimum of 180 buildings;
- 426 550 m<sup>2</sup> of floor area renovated;
- improved living conditions for 13 500 residents;
- energy savings in renovated residential buildings of 21 500 MWh/annum.

### 7.1.3 Energy performance certificates' use and layout in relation to nZEB standard

### 7.1.4 Supervision (energy advice and audits)

### 7.1.5 Information (tools)

### 7.1.6 Demonstration

### 7.1.7 Education and training

## 7.2 Non-residential buildings

### 7.2.1 Relevant regulations

See section 6-7

### 7.2.2 Relevant economic incentives and financing instruments



Completed projects and construction to support improvement of the investment climate and improve the energy efficiency of residential and public buildings under OP 'Regional Development' 2007—13. New financial instruments have been devised during this period, such as the Housing Renewal Fund, which is a financial engineering instrument that aims to provide low-interest loans and loan guarantees for owners' associations in multi-occupancy buildings and to implement energy efficiency and renewable energy measures.

During the period 2007—12 projects were concluded and the following indicators accounted:

- number of buildings renovated: 285, of which 243 were educational, 20 cultural and 22 social services buildings;
- total energy savings: 34 994.89 MWh.

The number of contracts for energy efficiency measures in buildings totaled 359, with the total value being BGN 959 921 111, and the number of contracts concluded being BGN 192 134 194. In the next Program period of OP 'Regional Development' 2014—20, energy efficiency in public and residential buildings will remain the main priority.

7.2.3 Energy performance certificates' use and layout in relation to nZEB standard

7.2.4 Supervision (energy advice and audits)

7.2.5 Information (tools)

7.2.6 Demonstration

7.2.7 Education and training

**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.**

In order to formulate a national definition for nearly zero-energy buildings, the following baseline assumptions are used:

- the definitions and requirements of Directive 2010/31/EU;
- the characteristics of the existing national legislative basis for assessing the energy performance of buildings;
- the specific economic and social conditions in Bulgaria;
- accounting the influence of local geographic, climatic and seismic conditions and impacts. A formulation has been sought that can be updated every 5 years in order to account for advances in technology, the country's economic development trends and good European practice. Establishing a national definition aims to achieve an economically viable cumulative effect of:
- reducing the energy consumed in buildings by improving the energy performance of building envelopes, microclimate parameter maintenance systems and other energy-consuming systems, and plants and devices in the buildings;
- the use of renewable energy generated in or in the immediate vicinity of buildings.

### **Model for assessing the achievability of energy consumption in accordance with the definition of a nearly zero-energy building**

On the basis of the national definition of nearly zero-energy buildings described above, an automated energy model has been devised for buildings, allowing express assessments of buildings' conformity with the definition's requirements to be carried out. The model is applicable both at the design stage and at the stage when the results are checked after building completion

## 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.**

### **Proposal to improve the energy performance of systems for maintaining building microclimates:**

- a minimum seasonal thermal pump transformation coefficient of 3.5;
- where central heating boilers are used – mandatory installation of condensation boilers;
- designing water-based heating systems with a heat medium temperature no higher than 60 °C.

These indicative proposals to improve the energy performance of buildings and increase the number of nearly zero-energy buildings will be approved in 2013–14 after the data from statistical and information systems on the state of energy consumption in existing buildings have been thoroughly analyzed, a number of engineering science and research projects have been carried out and feasibility and applicability calculations have been made, taking into account national characteristics. These would have been calculated using correlational and simulation methods, when national parameters expressed in numeric reference values for annual energy consumption by energy consumption class and building type have been determined, and after a public discussion has been conducted involving all players — designers, builders, consultants, consumers, etc. The indicative proposals will be approved with the adoption of the relevant standards for energy efficiency of buildings

### **Proposal to improve the energy performance of building envelopes:**

This element was checked for four reference buildings: a hospital; a school; a kindergarten; and a 5-storey residential block. The check showed a reduction in the energy demand for heating and hot water of between 18 and 32 %.

## Annex- Definition of nZEB

1. General Information		
Country	Bulgaria	
Name of regulation, directive, certification scheme	National Plan for Nearly zero-energy buildings	
Editor of regulation, directive, certification scheme	Ministry of Investment Planning	
Year of introduction of current version	2014	
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 type="radio"/> Nearly zero energy buildings <input type="radio"/> Zero energy buildings <input checked="" type="radio"/> Other	
Integration and consideration in national directive	<p>will replace current directive</p> <p>The draft national definition of nearly zero-energy buildings in Bulgaria has been defined in accordance with the underlying principles of the correct formulation of the definition of nearly zero-energy buildings extrapolated at European level. To apply the definition and to account for the parameters properly, a framework of conditions has been set up. This is reported below.</p>	
2. Field of Application		
2.1 Building category		
<p>Select one and describe right is this typology included in the directive? Are special requirements or exceptions defined for this typology?</p> <p>If more than one definition exists, you can duplicate this appendix for each of them.</p> <p><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></p>		
<b>Category</b> <input type="radio"/> Residential <input type="radio"/> Non-residential <input checked="" type="radio"/> Residential and Non-residential	<p>To calculate the energy consumption indicators and the energy performance of a building, the following classifications are used:</p> <ul style="list-style-type: none"> <li>residential, including individual houses; low, medium and high-rise residential buildings (blocks of flats); mixed;</li> <li>non-residential, including administrative buildings (administrative, office, ceremonial buildings, etc.); educational buildings (schools, kindergartens, etc.); health care buildings (various health establishments, etc.); hotel and services buildings (hotels, motels, halls of residence, etc.); commercial</li> </ul>	
single family houses		included in the directive
apartment blocks		included in the directive
Offices		included in the directive

<b>educational buildings</b>	included in the directive	buildings (shopping centers, markets and arcades, shops, etc.); public catering establishments (catering outlets, restaurants, etc.); sports buildings; and other public use buildings (buildings for culture and the arts, transport buildings, etc.).
<b>hospitals</b>	included in the directive	
<b>hotels and restaurants</b>	included in the directive	
<b>sports facilities</b>	included in the directive	
<b>wholesale and retail trade service buildings</b>	included in the directive	
<b>other types of energy-consuming buildings</b>	included in the directive	
<b>2.2 New/retrofit buildings</b> <b>Select one and describe right. If more than one definition exists, you can duplicate this appendix for each of them.</b>		
<p><i>New, and existing buildings that are subject to major renovation, should meet minimum energy performance requirements adapted to the local climate.</i></p> <p><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></p>		
<input type="radio"/> New buildings <input type="radio"/> Retrofit <input checked="" type="radio"/> New and retrofit	Building status: New or after major renovation	
<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>		
<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>		
<input type="radio"/> Private <input type="radio"/> Public <input checked="" type="radio"/> Public and private	Ownership Private or central/local government-owned. Building types: Residential and public service buildings	
<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).		
<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></p> <p><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>		

<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		
<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 checked="" 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		
<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>		
<b>space heating, domestic hot water</b>	considered	A.2. Balance make-up: Energy used for the following purposes is accounted: <ul style="list-style-type: none"> <li>• heating</li> <li>• hot water</li> <li>• ventilation</li> <li>• cooling</li> <li>• lighting</li> <li>• pumps, ventilators</li> <li>• appliances</li> <li>• technical systems</li> </ul>
<b>ventilation, cooling, air conditioning</b>	considered	

<b>auxiliary energy</b>	considered				
<b>lighting</b>	considered				
<b>plug loads, appliances, IT</b>	considered				
<b>central services</b>	considered				
<b>electric vehicles</b>	not considered				
<b>embodied energy</b>	not considered				
<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>					
<b>generation on-site</b>	considered	The energy from renewable sources used generated within the building or within a radius of 15 km.			
<b>generation near by</b>	considered				
<b>generation external</b>	considered				
<b>crediting</b>	not considered				
<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</i>  <i>[...] 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 type="radio"/> Life cycle balance  <input checked="" type="radio"/> Yearly  <input type="radio"/> Seasonal  <input type="radio"/> Other	The energy balance is drawn up on an annual basis through computation. The monthly balance method of BDS EK 180 13790 is used				
<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 type="radio"/> nothing defined <input checked="" type="radio"/> other	
<b>4. Accounting system</b>	
<b>4.1 Normalization</b>	
<p><i>[...] including a numerical indicator of primary energy use expressed in kWh/m<sup>2</sup> per year. Reference: EPBD article 9.3a</i></p>	
<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 checked="" type="radio"/> treated floor area <input type="radio"/> conditioned area <input type="radio"/> other	<p>1. Total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area (Af) in m<sup>2</sup>, defined as the energy consumed and primary energy in the case of new buildings, where the outline plan/design agreement includes the design of a general heating installation for the whole building;</p> <p>2. Total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area (Af) in m<sup>2</sup>, defined as the net energy in the case of new buildings where the outline plan requires local heating, or whose structures do not allow central heating with a common heating installation to be incorporated;</p> <p>3. Total annual energy consumption for heating, cooling, ventilation, hot water, lighting and appliances per square meter of the total heatable building area (Af) in m<sup>2</sup> or per cubic meter of heatable space (Vs) in m<sup>3</sup>, in terms of primary energy in the case of existing buildings with a rated temperature of the internal air above 15 °C and relative air humidity below 70 %.</p>
<b>4.2 Primary metric</b>	
<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/m<sup>2</sup> 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>	
<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 checked="" type="radio"/> primary / source energy (renewable part not included) <input type="radio"/> (equivalent) carbon emissions	<p>1) Specific energy consumption: This is defined by the conditioned area of the building calculated based on external dimensions in accordance with BDS EK 15217.</p> <p>2) Primary energy: This is determined for the type of energy supplied using nationally determined coefficients that account for losses incurred during generation, transmission and distribution. These coefficients have a constant value at an annual level.</p> <p>3) CO<sub>2</sub> emission equivalent: This is determined for the relevant type of energy using nationally determined coefficients. The assessment of emissions accompanies the assessment of the specific consumption of primary energy as additional information about the building.</p>



<input type="radio"/> exergy <input type="radio"/> energy costs <input type="radio"/> environmental credits <input type="radio"/> points (labeling system) <input checked="" type="radio"/> other	
<b>4.3 Secondary metric</b>	
<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) <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	
<b>4.4 Symmetric or asymmetric weighting</b>	
<input type="radio"/> symmetrical weighting <input type="radio"/> asymmetrical weighting	
<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"/> static conversion factors	Primary energy: This is determined for the type of energy supplied using nationally determined coefficients that account for losses incurred during generation, transmission and distribution. These coefficients have a

<input type="radio"/> quasi static conversion factors  <input type="radio"/> dynamic conversion factors	constant value at an annual level
<b>5. Further requirements</b>	
<b>5.1 Fraction of renewables</b>	
<p>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>	
<input checked="" type="radio"/> defined  <input type="radio"/> not defined  <input type="radio"/> defined in other regulation	<p>In the cases explained in ZEVI at least 15 percent of the total amount of heat and cooling energy needed for the building must be produced from renewable sources by implementing:</p> <ol style="list-style-type: none"> <li>1. centralized heating using biomass or geothermal energy;</li> <li>2. individual biomass incineration units with a conversion efficiency of at least 85 percent for residential and commercial buildings, and 70 percent for industrial buildings;</li> <li>3. solar heating installations;</li> <li>4. thermal pumps and surface geothermal systems. Single and multi-occupancy residential buildings with a floor area of up to 500 m2 are required to have at least 50 % of the energy needed for heating, hot water, ventilation and cooling is from renewables. All buildings with a floor space of 500 to 7 000 m2 are required to have at least 30 % of the energy needed for heating, hot water, ventilation and cooling is from renewables. The share of electricity in the building's annual primary energy consumption balance (including electricity for the heating, hot water, ventilation and cooling systems) is no more than 30 %. All buildings with a floor space of more than 7 000 m2 are required to have at least 20 % of the energy needed for heating, hot water, ventilation and cooling is from renewables. The share of electricity in the building's annual primary energy consumption balance (including electricity for the heating, hot water, ventilation and cooling systems) is no more than 40 %.</li> </ol>
<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.	
<b><u>Load match</u></b>  <input type="radio"/> defined  <input type="radio"/> not defined	
<b><u>Grid interaction</u></b>	

<input type="radio"/> defined  <input checked="" type="radio"/> not defined	
<b>5.3 Energy performance or rating requirements</b>	
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 [...]</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>	
<b><u>Performance or rating</u></b>  <input checked="" type="radio"/> defined  <input type="radio"/> not defined  <input type="radio"/> defined in other regulation	<p>The rules for setting up a scale of energy consumption classes and for classifying a particular building to a particular class from A to G on the energy scale are normatively determined. The scale of energy consumption classes is based on two integrated energy performance values: EPmax, g and EP max,s defined as the primary energy or as the energy demand (supplied), or saved carbon dioxide emissions, as follows</p> <p>1. EPmax, g is the total specific energy consumed for heating, cooling, ventilation, hot water and lighting calculated in accordance with the National Methodology; the thermal engineering values of the building envelope and elements, and the efficiency of elements and plants of the heating, cooling, ventilation and domestic water heating systems, conform with current legislative acts at the time of the assessment;</p> <p>2. EPmax, s is the total specific energy consumed for heating, cooling, ventilation, hot water and lighting calculated in accordance with the National Methodology; the thermal engineering values of the building envelopes and elements, and the efficiency of heating, cooling, ventilation and domestic water heating system systems conform with legislative acts current in the year the building is put into operation.</p>
<b><u>Energy Performance indicator</u></b>  Is an energy performance indicator defined? If yes, type the values and the according unit.	<p>YES</p> <p>The building energy consumption indicators have been classified into three main groups:</p> <ul style="list-style-type: none"> <li>group one: indicators to characterize the energy converting and transmitting properties of building envelopes and elements of the microclimate maintenance system;</li> <li>group two: indicators characterizing the energy consumption of technological processes for heating, cooling, ventilation and domestic hot water;</li> <li>group three: indicators characterizing the energy consumption of the building as a whole.</li> </ul>
<b><u>Numeric indicator of primary energy use</u></b>  Is a numeric indicator of primary energy use defined? If yes, type the values and the according unit.	<p>Primary energy consumption conforming with class A on the national scale.</p> <p>nZEB is defined as Primary energy consumption conforming with class A on the national scale. Under the current requirements, class A energy consumption is less than 1/2 of class B, with the latter regulating the mandatory requirement for making new buildings operational.</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)	
<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	
<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.	
<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>	
<input checked="" type="radio"/> defined  <input type="radio"/> not defined  <input type="radio"/> defined in other regulation	Current legislative acts and documents set out the requirements for the maximum permissible variations in microclimate parameters: air temperature; relative humidity; air movement; minimum fresh air supply; light; and noise level.
<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 type="radio"/> defined  <input checked="" type="radio"/> not defined	

# ECOFYS



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