CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

Implementation of the EPBD Bulgaria

Status in 2020

AUTHORS
Tsvetomira Kulevska, Ognian Markovski, *Sustainable Energy Development Agency (SEDA)*

NATIONAL WEBSITES
https://seea.government.bg, https://me.government.bg

1. Introduction

Actions for increasing energy efficiency have actively been applied during the last few decades in Bulgaria. This report outlines the development of the legal and technical measures to improve energy efficiency in buildings.

This report presents an overview of the application of the principles of the EPBD, Directives 2002/91/EC and 2010/31/EC, amended by Directive (EU) 2018/844. It outlines the development of regulatory measures set up to ensure mechanisms for reducing energy consumption in buildings in Bulgaria. In addition, efforts have been made to identify guidelines for future mechanisms to continue improving the energy efficiency of buildings.

The Minister of Energy is responsible for implementing all directives on energy efficiency (including the EPBD). All plans and programmes, including those in the building sector, are covered by the National Energy Efficiency Action Plan 2014-2020 (NEEAP). The Minister of Energy coordinates implementation in all sectors and produces reports on executing the NEEAP.

The Ministry of Energy is in charge of implementing state policy to increase energy efficiency in final energy consumption and in regards to the provision of energy services in Bulgaria. The Ministry of Regional Development and Public Works is responsible for developing and implementing technical rules and regulations in the field of energy performance for new and existing buildings, as well as projects for renovating buildings and improving their energy efficiency. The Sustainable Energy Development Agency (SEDA) implements the national policy on improving energy efficiency of both energy end-use and energy services.

By 2005, Bulgarian legislation had already introduced some principles of Directive 2002/91/EC. More recently, the following legislation was enacted:

- The Energy Efficiency Act, which came into force in 2008, with further amendments (repealed as of 2015);
- The Energy Efficiency Act[1], which came into force in 2015, with further amendments, which transposed both the Directive 2002/91/EC and Directive 2010/31/EC into national legislation[2].

2. Current Status of Implementation of the EPBD

2.I. Energy performance requirements: NEW BUILDINGS

2.I.i. Progress and current status of new buildings (regulation overall performance)

The Energy Efficiency Act, the Law on Spatial Planning and the relevant regulations that follow set out the legislative and technical measures that should, by law, be applied to new buildings. The energy performance of a new building, before the commissioning stage, shall be certified by an "*Energy Performance Certificate of New Building*". This is valid for six years from the date of commissioning of the building and is issued on the basis of the energy performance of the building according to the development and project design of the building. Minimum energy performance requirements have been gradually tightened since the EPBD was first implemented. At present, these requirements are set with the goal of achieving cost-optimal levels and have been defined for ten categories of buildings, depending on their assigned use. A new building meets the requirement for energy efficiency when the value of their integrated energy efficiency indicator (specific annual expenditure of primary energy in kWh/m^2) corresponds to at least the energy efficiency class "*B*".

The National Plan for Nearly Zero-Energy Buildings (NZEB), adopted in December 2015, provides the national definition and the technical parameters of NZEB and the national annual targets for construction of new NZEB by 2020.

2.I.ii. Format of national transposition and implementation of existing regulations

According to the Energy Efficiency Act and the Law on Spatial Planning, any building investment project must meet the energy efficiency requirements. Contracting entities are obliged to obtain an EPC of the building. This applies to new building projects, and, in the case of existing buildings, to reconstruction, major renovations, overhauls and refurbishments. Compliance with prescribed measures is assessed through energy audits performed by companies registered with the SEDA.

Ordinance No. 7 of 2004 on the energy efficiency in buildings, as amended in 2017, defines the cost-optimal levels of minimum energy performance requirements for buildings (or for individual building units) as well as the energy efficiency technical requirements and indicators. It also defines the methodology for calculating the indicators of energy consumption and the energy performance of buildings, including those for NZEB. When designing new buildings and reconstructing existing buildings, the investments in energy efficiency are eligible provided that the materials and the systems are in compliance with legal standards and technical specifications.

Ordinance No. RD-16-932 of 23 October 2009, on terms and conditions for inspecting the energy efficiency of boilers and air-conditioning (AC) systems, defines the framework for the compliance checking process of technical building systems. The SEDA is the authority that imposes penalties for non-compliance. Although, by the end of 2019, no penalties had yet been imposed.

2.I.iii. Action plan for progression to NZEB for new buildings

The National Plan for Nearly Zero-Energy Buildings 2015-2020 was adopted by the Council of Ministers in December 2015. The plan contains:

1. the national definition and the technical parameters of NZEB, reflecting the national conditions;
2. the national targets for increasing the number of NZEB depending on the classification of the types of buildings;
3. policies and mechanisms, including those of a financial nature, to stimulate the construction of NZEB.

The definition of NZEB is given in the Energy Efficiency Act of 15 May 2015. A NZEB is a building that simultaneously fulfils the following conditions:

1. the energy consumption of the building, defined as primary energy, complies with Class A on the scale of energy consumption classes for buildings of the relevant type; and
2. not less than 55% of the energy consumed (supplied) for heating, cooling, ventilation, domestic hot water and lighting is energy from RES produced on-site or near the building.

National targets for the construction of new buildings that satisfy the definition of the NZEB are given in Table 1. These targets are categorised according to the groups of buildings and estimated cumulative figures of end-use energy savings and emission reductions as of 2020 are provided.

Groups of buildings	Total floor area in m^2	Investments in BGN	End-use energy savings and emission reductions		
			ktoe	GWh	t CO_2
Administrative	492,895	110,907,633	8.2	95.7	11,090.2
Residential	74,570	17,474,562	1.2	13.8	3,314.9
Others	140,598	31,385,202	3.2	36.9	4,722.8
Total 2016 - 2020	**708,063**	**159,767,397**	**12.6**	**146.4**	**19,127.9**

Table 1: National targets for constructing new NZEB by 2020

The intermediate annual targets for improving the energy performance of new administrative buildings which include buildings occupied and owned by public authorities to satisfy the NZEB definition are given in Table 2. This table also includes estimated cumulative figures of end-use energy savings and emission reductions.

Year	Total floor area in m^2	Investments in BGN	End-use energy savings and emission reductions		
			ktoe	GWh	t CO_2
2016	9,092	2,045,677	0.15	1.80	204.57
2017	27,821	6,259,773	0.43	5.04	625.98
2018	66,214	14,898,259	1.00	11.63	1,489.83
2019	192,968	43,417,784	3.29	38.21	4,341.78
2020	196,800	44,286,140	3.35	38.97	4,428.00
Total 2016 - 2020	**492,895**	**110,907,633**	**8.22**	**95.65**	**11,090.16**

Table 2: National targets for constructing new administrative NZEB by 2020.

The Research Centre of the Technical University of Sofia, built in 2012, was the first NZEB in Bulgaria. The total primary energy use is 47.94 KWh/m^2 per year.

Figure 1: The first NZEB in Bulgaria, the Research Centre of the Technical University of Sofia.

2.I.iv. Requirements for building components for new buildings

Minimum energy performance requirements are set for the design of new buildings and renovated building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope. These requirements are specified in Ordinance No. 7 of 2004 on the energy efficiency in buildings, as amended in 2017 (see item 03.06 of KIDs for existing buildings).

2.I.v. Enforcement systems new buildings

No data available

2.II. Energy performance requirements: EXISTING BUILDINGS

2.II.i. Progress and current status of existing buildings (regulation overall performance)

The Energy Efficiency Act, the Law on Spatial Planning and the relevant executive orders based on these laws set out the legislative and technical measures that must, by law, be applied to existing buildings. The "*Energy Performance Certificate of New Building*" is valid for 6 years from the date of commissioning of the building (see section 2.I.i.). The owners of all these buildings are required to obtain an "*Energy Performance Certificate of Existing Building*" within a three-year period. This period begins three years after the date of commissioning. The energy performance of existing buildings is established by an energy audit, which is completed with the issuing of an EPC of the building. The "*Energy Performance Certificate of Existing Building*" shall be updated following any change in the energy performance of the building, for example after a change of use, deep renovation, or major renovation.

Minimum energy performance requirements for existing buildings have been gradually tightened since the EPBD was first implemented. At present, these requirements are set with the goal of achieving cost-optimal levels and have been defined for ten categories of buildings, depending on their assigned use. Existing buildings meet the requirement for energy efficiency when the value of their integrated energy efficiency indicator ("*specific annual expenditure of primary energy*" in kWh/m^2) corresponds, at least, to energy efficiency class "*B*", for buildings commissioned after 1 February 2010, or to class "*C*", for buildings commissioned before 1 February 2010.

The National Plan for Nearly Zero-Energy Buildings, adopted in December 2015, provides the national definition and the technical parameters of NZEB and the national targets for transforming refurbished state-owned and municipality-owned public buildings into NZEB by 2020.

2.II.ii. Regulation on individual parts, distinct from whole building performance

Minimum energy performance requirements are set for the renovated building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope. These requirements are specified in Ordinance No. 7 of 2004 on the energy efficiency in buildings, as amended in 2017 (see item 03.06 of KIDs for existing buildings).

2.II.iii. Initiatives/plans to improve the existing building stock

The National Plan for Nearly Zero-Energy Buildings sets out the annual intermediate targets applicable for transforming refurbished public buildings owned by public authorities into NZEB (Table 3). These targets include the estimated cumulative figures of end-use energy savings and emission reductions. Public sector buildings are being used as pilot projects to encourage improvements in the existing building stock.

Year	Total floor area in m^2	Investments in BGN	End-use energy savings and emission reductions		
			ktoe	GWh	t CO_2
2016	0	0	0	0	0
2017	45,810	14,659,200	0.65	7.56	1,145
2018	66,214	29,318,400	1.30	15.11	2,291
2019	109,950	35,184,000	1.56	18.14	2,749
2020	137,450	43,984,000	1.95	22.68	3,436
Total 2016 - 2020	**384,830**	**123,145,600**	**5.46**	**63.49**	**9,621**

Table 3: National targets for transforming refurbished public buildings into NZEB by 2020.

The "*National Long-term Programme for Mobilising Investments in the Implementation of Measures for Improving the Energy Performance of Buildings*" is part of the NEEAP.

The Energy Efficiency Act in force provides for the adoption of:

- a long-term national programme to encourage investments in implementing measures to enhance the energy performance of the public and private national residential and commercial building stock;
- a national plan for improving the energy performance of heated and/or cooled state-owned buildings occupied by the state administration.

These plans and programmes are included as part of the NEEAP and are outlined below.

The "*Long-term national programme to encourage investments in implementing measures to enhance the energy performance of the public and private national residential and commercial building stock 2016 - 2020*" contains:

- an overview of the national building stock;
- the definition of cost-effective approaches to improving the energy performance of buildings, relevant to the building type and climatic zone;
- policies and measures to stimulate cost-effective deep improvement of the energy performance of buildings, including staged renovations;
- setting up a financial framework to guide investment decisions of investors, the construction industry and financial intermediaries;
- a forecast of the expected energy savings.

In addition to the above points, the "*National Plan for improving the energy performance of heated and/or cooled state-owned buildings occupied by the state administration 2016 - 2020"* contains the following point as well:

- a prioritised list of the buildings that, on 1 January of the relevant year, do not meet the minimum energy performance requirements.

To help reach the national energy efficiency target, at least 5% of the total floor area over 250 m^2 shall be renovated annually in all buildings which on 1 January of each year do not meet the minimum energy performance requirements.

2.II.iv. Long Term Renovation Strategies, status

No data available

2.II.v. Financial instruments and incentives for existing buildings

The Energy Efficiency Act provides for schemes and mechanisms which may be applied to encourage energy efficiency, as follows:

1. energy performance contracts;
2. energy savings certificates;
3. financing from the Energy Efficiency and Renewable Sources Fund or from other financial intermediaries;
4. other national or European support schemes and mechanisms.

The "*National Programme for Energy Efficiency of Multi-Family Residential Buildings*" was launched in February 2015 by the Bulgarian government. The programme is being implemented across the country and has a financial resource of BGN 2 billion from the state budget. The programme can provide up to 100% of grant funding to eligible projects. Buildings eligible for support are multi-family residential buildings, provided they meet the national minimum energy performance requirements for existing buildings – energy efficiency class "*C*". There are key principles for ensuring the programme complements the

Operational Programme "*Regions in Growth*" 2014-2020, which also provides grant support for renovating residential buildings (see section 3 for further details).

Under the Local Taxes and Fees Act, buildings which were commissioned before 1 January 2005 and which have acquired an EPC with an energy efficiency class of B, C or D are granted exemption from immovable property tax. This exemption can be for three, five, seven or ten years depending on the date of commissioning, the energy efficiency class, and whether RES is used to offset consumption of the building itself.

2.II.vi. Information campaigns / complementary policies

Targeted and specialised information campaigns, for the enhancement of the energy performance of buildings, have been conducted through several projects. These campaigns were implemented by the SEDA and NGOs within the framework of the EU-funded Intelligent Energy-Europe II programme.

Information days were held during 2015 and 2016 for beneficiaries under two grant schemes, for funding public and residential buildings, within the framework of Operational Programme "*Regions in Growth*" 2014-2020.

A list of financing mechanisms and schemes promoting energy efficiency in buildings has been published and is regularly updated on the SEDA's website (www.seea.government.bg/en). This includes information on the relevant regulations, procedures and conditions of certification, a database of auditing companies and experts, and information on training in the field of energy efficiency and existing qualification schemes. Most of the databases developed and maintained by the SEDA are also freely available, although some of them require online registration. Nevertheless, the SEDA's regional offices currently provide information to various interested parties on the possibilities of energy efficiency measures.

2.III. Energy performance certificate requirements

2.III.i. Progress and current status on EPCs at sale or rental of buildings

According to the Energy Efficiency Act in force, an EPC is mandatory for the purpose of selling or renting out a new or existing building (or an individual building unit). However, there are exceptions for some buildings: buildings of cultural merit, places of worship, and residential buildings with a limited annual time of use, to name a few. The energy performance of a new building, before the commissioning stage, is required to be certified by an "*Energy Performance Certificate of New Building*".

In all of these cases:

1. Upon the sale of the building as a whole, the seller shall provide the purchaser with the original EPC of the building.

2. Upon the sale of a building unit in a building, the seller shall provide the purchaser with a copy of the EPC of the building.

3. Upon renting the building, or a building unit therein, the landlord shall provide the tenant with a copy of the EPC of the building.

2.III.ii. Quality Assurance of EPCs

The verification of energy audits is performed by the SEDA through systematic or random sampling of the audited buildings. Control over the activity of the energy auditors is exercised by means of:

- checking the validity of the input data of the building used to issue the EPC, as well as the results stated in the certificate;
- checking the input data entered in the EPC and verifying the results, including the recommendations made for energy efficiency improvement;
- a full check of data, results and measures prescribed for energy efficiency improvement by an on-site visit in order to verify the validity between the data stated in the EPC and the certified building.

The total number of EPCs issued in 2017, 2018, and 2019 amounts respectively to 1057, 1086, and 1067, and an independent random control was carried out by the SEDA on all these EPCs.

Up to the end of 2019, no fines/penalties had been imposed.

2.III.iii. Progress and current status of EPCs on public and large buildings visited by the public

All existing buildings, including public and large buildings visited by the public, shall be subject to mandatory audits and certification - with the exception of some buildings of cultural merit, places of worship, and residential buildings with a limited annual time of use, to name a few.

2.III.iv. Implementation of mandatory advertising requirement – status

The owners of existing buildings with a total floor area of over 250 m^2 for which an EPC has been issued, are required to clearly display the certificate in the building. The cover page of the EPC reflects representative data, which shall be placed in a prominent location in the building, clearly visible to the public. In particular, the cover page of the EPC shall state the following results:

- the current energy performance of the building and the conformity thereof with the scale of energy efficiency class at the time of the energy audit;
- the estimated energy efficiency class, which is expected to be achieved after a package of energy efficiency measures in the building have been implemented.

Furthermore, where a building for which an EPC has been issued (or a building unit therein) is announced for sale or rental, the parameter "*Specific annual expenditure of primary energy*" in kWh/m^2, stated in the certificate, shall be noted in all advertisements. Before concluding a contract of sale or a rental agreement, the seller or landlord shall show the EPC to the prospective buyer or tenant.

2.IV. Smart buildings and building systems

2.IV.i. Status and plans on smart buildings

No data available

2.IV.ii. Regulation of system performance

The technical building systems requirements apply to new buildings and the refurbishments and/or major renovations of existing buildings (when major renovations include all technical systems). The technical building systems requirements are specified in Ordinance No. 7 of 2004 on the energy efficiency in buildings, as amended in 2017 (see item 03.06 of KIDs for existing buildings)

The Energy Efficiency Act states that the following energy efficiency improvement measures shall be assessed as regards their technical and economic appropriateness:

- decentralised systems for energy production and use from RES;
- electricity and heat cogeneration installations;
- district or block heating and cooling, including those that are based entirely or partially on energy from RES;
- heat pumps.

These assessments are applicable for improvement measures that are recommended upon each change of use, deep renovation, or major renovation of a building (or part of a building) in use.

Energy performance must conform to the minimum regulatory requirements defined in Ordinance No. 7 of 2004 on the energy efficiency in buildings, as amended in 2017, after deep or major renovations that lead to a change in the energy performance of the building.

2.IV.iii. Building Automation and Controls (BACs)

No data available

2.IV.iv. Encouragement of intelligent metering

For the time being, no special measures to stimulate the introduction of intelligent metering systems are in place in Bulgarian legislation. However, the Energy Act obligates energy companies to provide customers of energy services related to electricity or natural gas supply with detailed information on the consumption. This is for every day, week, month and year, using smart metering systems, by providing the final customers data for a period covering not less than 24 previous months. This data can be provided to the customers via an internet portal or through the individual smart metering device in their building.

2.IV.v. Progress and current status on heating systems (Inspection / Equivalence)

Bulgaria has a full regular inspections scheme in place for heating systems with hot water boilers and AC systems in buildings. The purpose of energy efficiency inspections of these systems is to establish the level of efficiency in operation and to identify measures for improvement of the inspected system efficiency.

The Energy Efficiency Act stipulates a regular inspection of heating systems with hot water boilers of an effective rated output for space heating purposes of more than 20 kW in all types of buildings. The inspection includes the following assessments:

- the condition and functioning of the accessible parts of building heating systems, including the hot water boilers, the heat supply control systems and the circulation pumps;
- the efficiency of hot water boilers, of a single rated output of more than 50 kW;

- the sizing of the hot water boilers compared with the heating requirements of the building - in case of changes made to the heating system or the heating requirements of the building in the meantime.

Depending on the installed capacity and the type of energy used, the heating systems with hot water boilers shall be subject to mandatory periodic energy efficiency inspections every three, four or eight years. The number of systems inspected in 2017, 2018 and 2019 are shown in Table 4. The inspections are carried out by registered energy auditors listed in a special public register, which is maintained and administrated by the SEDA and promoted via the SEDA's website. The SEDA is the body responsible for the independent control of inspection reports on heating systems. A restricted access database on the condition of the heating systems is maintained by the SEDA (Table 5).

Year	2017		2018		2019	
	Number	Installed capacity (MW)	Number	Installed capacity (MW)	Number	Installed capacity (MW)
Heating systems	218	90.40	204	119.01	77	57.37
AC systems	101	16.74	122	8.63	23	10.17
Total	**319**	**107.14**	**326**	**127.64**	**100**	**67.54**

Table 4: Inspections of boilers and AC systems in buildings, 2017-2019.

Year	2017		2018		2019	
	Number	Installed capacity (MW)	Number	Installed capacity (MW)	Number	Installed capacity (MW)
Heating systems	23	3.74	26	3.52	1	0.125
AC systems	11	1.01	92	4.51	3	0.119
Total	**34**	**4.75**	**118**	**8.03**	**4**	**0.244**

Table 5: Registered boilers and AC systems in buildings, 2017-2019.

2.IV.vi. Progress and current status on AC systems(Inspection / Equivalence)

According to the Energy Efficiency Act, AC systems in buildings of a rated output of more than 12 kW are subject to mandatory regular energy efficiency inspection every four years. The number of systems inspected in 2015 and 2016 are shown in Table 4. The inspection includes an assessment of the condition and functioning of the accessible parts of the AC system, the efficiency of the AC system, and the sizing of the AC system compared to the cooling requirements of the building. The sizing is inspected in case of changes made to the system or the cooling requirements of the building in the meantime.

Registered energy auditors, listed in a special public register, which is maintained and administrated by the SEDA and promoted via the SEDA's website (www.seea.government.bg/en), carry out the inspections. The SEDA is the body responsible for independent control of inspection reports on AC systems. A restricted access database on the condition of the AC systems is maintained by the SEDA (Table 5).

2.IV.vii. Enforcement and impact assessment of inspections

Enforcement and penalties

Control over the activity of the inspectors is undertaken by means of checks. On the basis of the results of the check, the SEDA may:

- issue mandatory requests to the inspectors, to eliminate any violations ascertained, accompanied by a time limit for compliance with the requests;

- draw up written statements recording administrative violations.

Any inspectors who fail to comply with the mandatory requests shall be liable to a fine of BGN 2,000-5,000 or to a penalty of BGN 10,000-30,000.

Up to the end of 2016, no fines/penalties have been imposed by the SEDA.

Quality control of inspection reports

The verification of inspection reports is performed by the SEDA by systematic or random sampling of all the inspection reports issued annually.

The total number of inspection reports issued in 2015 and 2016 amounts respectively to 337 and 182 (Table 4). An independent random control was carried out by the SEDA on all these inspection reports.

Impact assessment, costs and benefits

Currently, no impact assessment has been made.

So far, there have been no studies comparing the costs and benefits of inspections of heating, AC and ventilation systems. Based on the feedback received from the inspection companies, it is estimated that only a fraction of the inspections results in measures undertaken to lower the energy consumption.

3. A success story in EPBD implementation

The residential sector in Bulgaria accounts for about ¼ of the final energy consumption. Energy is used mainly in buildings and primarily for space heating (around 70% of energy use). The efficiency potential in space heating is significant. The pre-1990 buildings, which account for 90% of the building stock, are in very poor condition due to lack of maintenance, and their energy consumption is at least twice as high as in those buildings built according to current standards, mostly due to the low quality of insulation. As a result, about 45% of households report that they could not keep the home 'adequately warm' and 34% indicate that they were facing arrears on energy utility bills. These are by far the highest figures within the EU, where the respective averages were 11% and 10%.

The government's "National Programme for Energy Efficiency of Multi-Family Buildings" (Programme) was launched during February 2015 to help address the difficulties above. The Programme builds upon past efforts aiming at much higher results. The Programme is fully in line with the country's and the EU's climate and energy strategy. It aims at:

- improving energy efficiency of multi-family residential buildings;
- extending the lifetime of buildings;
- contributing to a reduction in local and global air pollution.

The Ministry of Regional Development and Public Works is responsible for the overall Programme design and coordination among government entities.

The "Programme Development Objective" is to secure better living conditions for citizens at multi-family buildings, heat comfort and better quality of the living environment through implementing energy efficiency measures.

The key characteristics of the Programme include the following:

- **Targeting:** Residential buildings of three or more floors, with six or more building units of residential use designed before 26 April 1999. Eligible buildings belong to a registered homeowners association, which would sign a contract with their respective municipalities authorising them to manage the renovation process. All 265 Bulgarian municipalities are eligible to participate in the Programme.

- **Financial support:** Up to 100% of grant support for eligible expenditures (no co-financing requirement) mainly covering measures to:

(i) improve the energy efficiency of the buildings (thermal insulation of building envelope, improvements of the heating, electrical work, etc.) and common spaces;

(ii) improve the structural soundness of the buildings to, amongst other things, comply with the current building code, if needed.

Measures to be implemented should bring the energy consumption of the building to at least energy efficiency class "C" (energy use between 191 kWh/m^2 and 240 kWh/m^2) at the lowest cost.

- **Implementation mechanisms:** The Programme is administered mainly through municipalities (decentralised implementation). They not only approve project applications and sign contracts, but are also responsible for procuring and accepting all energy and structural audits, approving detailed designs, issuing construction permits and performing construction supervision. Public procurement, supervision and oversight are done in line with existing national legislation and auditing and construction standards. Regional governors in their capacity of representatives of the state have an oversight role of the Programme in their respective region.

- **Financing of the Programme:** The Programme has an overall budget of BGN 2 billion (about 1 billion €) financed by the state budget. The Bulgarian Development Bank, acting as a paying agent, is responsible for mobilising the financing for the Programme and channelling the resources to municipalities according to signed contracts with the municipalities and regional governors.

4. Conclusions, future plans

The legal framework on the energy efficiency of buildings in Bulgaria has been expanded in conformity with the EPBD and other EU Directives. It stimulates the wider application of new financial and market mechanisms targeting energy end-users with the aim of facilitating the application of energy efficiency measures in the building stock.

Current plans and programmes in place have contributed towards the achievement of the national energy efficiency targets by 2020. These include:

- implementing the ambitious National Plan for Nearly Zero-Energy Buildings, 2015-2020;

- completing the "*National Programme for Energy Efficiency of Multi-Family Residential Buildings*";

- achieving a high level of absorption of the EU financial resources under the projects for building renovations within the framework of the Operational Programme "*Regions in Growth*" 2014-2020.

These plans and programmes will also contribute towards making further energy efficiency improvements after 2020. This process will be boosted by the upcoming adoption of the *Long-Term National Strategy to Support the Renovation of the National Building Stock of Residential and Non-Residential Buildings by 2050.*

Endnotes

1. Energy Efficiency Act
2. https://seea.government.bg/documents/EE_Act_2018_ENG.pdf

Annexes -Key Indicators & Decisions

Key Indicators & Decisions – General Background

no	Key Implementation Decisions – General Background	Description / value / response	Comments
01.01	Definition of public buildings (according to article 9 b)	There is no adequate definition of public buildings in Bulgarian legislation corresponding to the wording "buildings occupied and owned by public authorities" referred to in paragraph 1 (b) of Art. 9 of the EPBD. The intermediate annual targets for improving the energy performance of new administrative buildings satisfying the definition of the nearly zero-energy buildings (NZEB) are given in the National Plan for NZEBs 2015-2020, adopted by the Council of Ministers in December 2015. These administrative buildings (offices) include buildings occupied and owned by public authorities (state, regional or local authorities).	
01.02	Definition of public buildings used by the public (according to article 13)	There is no definition of public buildings used by the public in Bulgarian legislation corresponding to the wording referred to in paragraph 1 of Art. 13 of EPBD. There is no need for such a definition because the Energy Efficiency Act stipulates that the owners of buildings with a total floor area over 250 m^2, for which an energy performance certificate has been issued, shall be bound to clearly display the certificate in the building.	
01.03	Number of residential buildings	2,078,906 residential buildings (3,970,719 dwellings) with useful floor space in dwellings of 195,999,682 m^2 as of 31.12.2019	Source: National Statistical Institute of Bulgaria
01.04	Number of non-residential buildings	Not available	
01.05	If possible, share of public buildings included in the number given in 01.04	Not available	
01.06	If possible, share of commercial buildings included in the number given in 01.04	Not available	
01.07	Number of buildings constructed per year (estimate)	Average number of newly constructed buildings for the period 2017-2019 is 6,088 buildings per annum.	Source: National Statistical Institute of Bulgaria
01.08	If possible, share of residential buildings constructed per year (estimate, included in the number given in 01.07)	Average number of newly constructed residential buildings for the period 2017-2019 is 2,527 residential buildings per annum.	Source: National Statistical Institute of Bulgaria
01.09	If possible, share of non-residential buildings constructed per year (estimate, included in the number given in 01.07)	Average number of newly constructed non-residential buildings for the period 2017-2019 is 3,561 non-residential buildings per annum.	Source: National Statistical Institute of Bulgaria
01.10	Useful floor area of buildings constructed per year in million square meters (estimate)	Average gross building area of newly constructed buildings for the period 2017-2019 is 4,004 x 10^6 m^2 per annum, including: • 2,094 x 10^6 m^2 of residential buildings; • 1,91 x 10^6 m^2 of non-residential buildings (0,128 x 10^6 m^2 of offices + 1,782 x 10^6 m^2 of other non-residential buildings.	Source: National Statistical Institute of Bulgaria

Key Indicators & Decisions – New Buildings

<table>
<tr><th>no</th><th>Key Implementation Decision – New Buildings</th><th>Description / value / response</th><th>Comments</th></tr>
<tr><td>02.01</td><td>Are building codes set as overall value, primary energy, environment (CO_2), reference building or other</td><td>Overall value, primary energy, environment (CO_2), reference building</td><td></td></tr>
<tr><td>02.02</td><td>Requirements for energy performance of residential buildings in current building code</td><td>A new residential building meets the requirement for energy efficiency, when the value of its integrated energy efficiency indicator (specific annual expenditure of primary energy" in kWh/m^2) corresponds at least to energy efficiency class “B” (96 kWh/m^2 ≤ EP ≤ 190 kWh/m^2)</td><td></td></tr>
<tr><td>02.03</td><td>Requirements for energy performance of non-residential commercial buildings in current building code</td><td>A new non-residential commercial building meets the requirement for energy efficiency, when the value of its integrated energy efficiency indicator (specific annual expenditure of primary energy in kWh/m^2) corresponds at least to energy efficiency class 'B' (276 kWh/m^2 ≤ EP ≤ 550 kWh/m^2).</td><td></td></tr>
<tr><td>02.04</td><td>Requirements for energy performance of non-residential public buildings in current building code</td><td>A new non-residential public building meets the requirement for energy efficiency, when the value of its integrated energy efficiency indicator (specific annual expenditure of primary energy" in kWh/m^2) corresponds at least to energy efficiency class “B”.
Different values of the integrated energy efficiency indicator are set for different categories of non-residential public buildings, as given in the table below:

<table>
<tr><th colspan="2">Category of buildings</th><th>EP_{min} in kWh/m^2</th><th>EP_{max} in kWh/m^2</th></tr>
<tr><td colspan="2">Offices</td><td>141</td><td>280</td></tr>
<tr><td colspan="2">Educational buildings:</td><td></td><td></td></tr>
<tr><td></td><td>Schools</td><td>51</td><td>100</td></tr>
<tr><td></td><td>Universities</td><td>91</td><td>180</td></tr>
<tr><td></td><td>Kindergartens</td><td>66</td><td>130</td></tr>
<tr><td colspan="2">Hospitals</td><td>141</td><td>280</td></tr>
<tr><td colspan="2">Hotels</td><td>171</td><td>340</td></tr>
<tr><td colspan="2">Sports facilities</td><td>176</td><td>350</td></tr>
<tr><td colspan="2">Buildings related to culture & arts</td><td>111</td><td>220</td></tr>
</table>
</td><td></td></tr>
<tr><td>02.05</td><td>Is the performance level of nearly zero energy (NZEB) for new buildings defined in national legislation?</td><td>Yes
The definition of NZEB is given in the Energy Efficiency Act of 15 May 2015 (amended as of 30 December 2016).</td><td></td></tr>
<tr><td>02.06</td><td>Nearly zero energy (NZEB) level for residential buildings (level</td><td>The energy consumption of a residential NZEB, defined as primary energy, complies with Class “A” on the scale of energy consumption classes for residential buildings (48 kWh/m^2 ≤ EP ≤ 95 kWh/m^2) and not less than 55% of the energy consumed (supplied) for heating, cooling, ventilation, domestic hot water</td><td></td></tr>
</table>

<table>
<tr><th>no</th><th>Key Implementation Decision – New Buildings</th><th>Description / value / response</th><th>Comments</th></tr>
<tr><td></td><td>for building code)</td><td>and lighting is energy from RES produced on-site or near the building.</td><td></td></tr>
<tr><td>02.07</td><td>Year / date for nearly zero energy (NZEB) as level for residential buildings (as indicated in 02.04)</td><td>January 2021</td><td></td></tr>
<tr><td>02.08</td><td>Nearly zero energy (NZEB) level for all non-residential buildings (level for building code)</td><td>The energy consumption of a non-residential NZEB, defined as primary energy, complies with Class “A” on the scale of energy consumption classes for non-residential buildings of the relevant type, as given in the table below:
<table>
<tr><th>Category of buildings</th><th>EP_{min} in kWh/m^2</th><th>EP_{max} in kWh/m^2</th></tr>
<tr><td>Offices</td><td>70</td><td>140</td></tr>
<tr><td>Educational buildings:</td><td></td><td></td></tr>
<tr><td>• Schools</td><td>25</td><td>50</td></tr>
<tr><td>• Universities</td><td>45</td><td>90</td></tr>
<tr><td>• Kindergartens</td><td>33</td><td>65</td></tr>
<tr><td>Hospitals</td><td>70</td><td>140</td></tr>
<tr><td>Hotels</td><td>85</td><td>170</td></tr>
<tr><td>Wholesale and retail trade services buildings</td><td>138</td><td>275</td></tr>
<tr><td>Sports facilities</td><td>88</td><td>175</td></tr>
<tr><td>Buildings related to culture & arts</td><td>55</td><td>110</td></tr>
</table>
and not less than 55% of the energy consumed (supplied) for heating, cooling, ventilation, domestic hot water and lighting is energy from RES produced on-site or near the building.</td><td></td></tr>
<tr><td>02.09</td><td>Year / date for nearly zero energy (NZEB) as level for non-residential buildings (as indicated in 02.06)</td><td>January 2019 for buildings occupied and owned by public authorities
and
January 2021 for the other non-residential buildings, incl. commercial buildings</td><td></td></tr>
<tr><td>02.10</td><td>Are nearly zero energy buildings (NZEB) defined using a carbon or environment indicator?</td><td>No</td><td></td></tr>
<tr><td>02.11</td><td>Is renewable energy a part of the overall or an additional requirement?</td><td>Renewable energy (minimum share of 55% of the final energy for heating, ventilation, domestic hot water and lighting) is a part of the overall requirement for a NZEB to be fulfilled on top of the maximum energy performance.</td><td></td></tr>
<tr><td>02.12</td><td>If renewable energy is an additional requirement to</td><td>N/A</td><td></td></tr>
</table>

<table>
<tr><th>no</th><th>Key Implementation Decision – New Buildings</th><th>Description / value / response</th><th>Comments</th></tr>
<tr><td></td><td>NZEB, please indicate level</td><td></td><td></td></tr>
<tr><td>02.13</td><td>Specific comfort criteria for new buildings, provide specific parameters for instance for airtightness, minimum ventilation rates</td><td>Yes.
Minimum energy performance requirements for buildings or building units take account of general indoor climate conditions. There are specific requirements for comfort, such as requirements for airtightness, minimum ventilation rates, humidity resistance, watertightness, that are used for calculating the energy performance of buildings.
The reference values for minimum rates of ventilation with the ambient air are, as follows:

<table>
<tr><th>Type of the room</th><th>n_{min}, h^{-1}</th></tr>
<tr><td>Habitable room</td><td>0.5</td></tr>
<tr><td>Kitchen or bathroom with a window</td><td>1.5</td></tr>
<tr><td>Office room</td><td>1.0</td></tr>
<tr><td>Meeting room, classroom</td><td>2.0</td></tr>
</table>

The level of airtightness for the whole building is given in the table below:

<table>
<tr><th>Level of airtightness of the building</th><th>Multifamily buildings at n_{50}, h^{-1}</th><th>Single-family & 2-family building at n_{50}, h^{-1}</th></tr>
<tr><td>Low</td><td>< 2</td><td>< 4</td></tr>
<tr><td>Medium</td><td>2 +- 5</td><td>4 +- 10</td></tr>
<tr><td>High</td><td>> 5</td><td>> 10</td></tr>
</table>

Depending on the category of building or building units there are specific requirements for comfort temperatures, as follows:
• 20°C in offices, conference and lecture halls, restaurants, classrooms, crèches, single-family houses;
• 16°C in department stores, museums and galleries;
• 15°C in churches.</td><td></td></tr>
</table>

Key Implementation Decision – Existing Buildings

<table>
<tr><th>no</th><th>Key Implementation Decision – Existing Buildings</th><th>Description / value / response</th><th>Comment</th></tr>
<tr><td>03.01</td><td>Is the level of nearly zero energy (NZEB) for existing buildings set in national legislation?</td><td>Yes</td><td></td></tr>
<tr><td>03.02</td><td>Is the level of nearly zero energy (NZEB) for existing buildings similar to the level for new buildings?</td><td>Yes</td><td></td></tr>
<tr><td>03.03</td><td>Definition of nearly zero energy (NZEB) for existing residential buildings (if different from new buildings)</td><td>There is no separate definition of NZEB for existing residential buildings. The definition is the same as for the new buildings.</td><td></td></tr>
<tr><td>03.04</td><td>Definition of nearly zero energy (NZEB) for existing non-residential buildings (if different from new buildings)</td><td>There is no separate definition of NZEB for existing non-residential buildings. The definition is the same as for the new buildings.</td><td></td></tr>
<tr><td>03.05</td><td>Overall minimum requirements in case of major-renovation</td><td>In case of major-renovation the buildings meet the requirement for energy efficiency when the value of their integrated energy efficiency indicator ("specific annual expenditure of primary energy" in kWh/m^2) corresponds, at least, to:
energy efficiency class “B”, for buildings commissioned after 1 February 2010 (the same requirements as those for new buildings – see item 2.1 and 2.2 above), or to
energy efficiency class “C”, for buildings commissioned before 1 February 2010, as given in the table below:
<table>
<tr><th>Category of buildings</th><th></th><th>EP_{min} in kWh/m^2</th><th>EP_{max} in kWh/m^2</th></tr>
<tr><td>Residential building</td><td></td><td>191</td><td>240</td></tr>
<tr><td>Offices</td><td></td><td>281</td><td>340</td></tr>
<tr><td rowspan="4">Educational buildings:</td><td></td><td></td><td></td></tr>
<tr><td>Schools</td><td>101</td><td>130</td></tr>
<tr><td>Universities</td><td>181</td><td>220</td></tr>
<tr><td>Kindergartens</td><td>131</td><td>195</td></tr>
<tr><td>Hospitals</td><td></td><td>281</td><td>365</td></tr>
<tr><td>Hotels</td><td></td><td>341</td><td>390</td></tr>
<tr><td>Wholesale and retail trade services buildings</td><td></td><td>551</td><td>600</td></tr>
<tr><td>Sports facilities</td><td></td><td>351</td><td>400</td></tr>
<tr><td>Buildings related to culture & arts</td><td></td><td>221</td><td>270</td></tr>
</table></td><td></td></tr>
<tr><td>03.06</td><td>Minimum requirements for</td><td>Minimum energy performance requirements are set for the renovated building elements that form part of the building</td><td></td></tr>
</table>

no	Key Implementation Decision – Existing Buildings	Description / value / response	Comment
	individual building parts in case of renovation	envelope and that have a significant impact on the energy performance of the building envelope. The values of the heat transfer coefficient cannot be higher than the reference values of the heat transfer coefficient, specified in the tables below:	

Type of Envelope Structures and Elements	U, W/m².K	
	Internal T° θi ≥15 °C	Internal T° θi < 15 °C
External walls in contact with the external air	0.28	0.35
Walls adjacent to unheated spaces, when the difference of average temperatures between heated and unheated spaces ≥ 5° C	0.50	0.63
External walls of heated basement adjacent to the ground	0.6	0.75
Floor slab over an unheated basement	0.50	0.63
Heated floor area directly bordering the ground in a building without basement	0.40	0.50
Floor of a heated basement	0.45	0.56
Floor of a heated space in contact with external air	0.25	0.32
Wall, ceiling or floor in contact with the external air or the ground with built-in area heating	0.40	0.50
Flat roof or sloped roof with heated underroof space designed for habitation	0.25	0.32
Ceiling slab of an unheated flat roof with an air layer with thickness δ > 0.30 m	0.30	0.38
External door, solid, adjacent to the external air	2.2	2.75
External door, solid, adjacent to an unheated space	3.5	4.38

Type of precast element - completed window system (transparent enclosing structures)	**U_w, W/m².K**
Exterior windows, glazed doors and windows, with vertical and horizontal axes of rotation, with a frame of PVC with three or more hollow chambers, roof windows of any type frame of PVC	1.4
Exterior windows, glazed doors and windows, with vertical and horizontal axes of rotation, wood frames, roof windows for each type of opening, with a wooden frame	1.6/1.8
Exterior windows, glazed doors and windows, with vertical and horizontal axes of rotation, with aluminium frame with a discontinuous thermal bridge	1.7
Suspended facades/facades with increased requirements	1.75/1.9

no	Key Implementation Decision – Existing Buildings	Description / value / response	Comment
		When an energy audit includes recommendations for improvement of the energy performance of building envelope itself or in combination with measures in technical building systems or devices consuming energy, the value of the heat transfer coefficient is allowed to be 10% over the reference values in both tables above. The technical building systems requirements apply to new buildings and the refurbishments and/or major renovations of existing buildings (when major renovations include all technical systems). The special requirements relate to: • parameters of systems for solar energy utilisation for domestic hot water; • seasonal efficiency of heat pumps with electrically driven compressors in heating mode (specific fan power $SPF_{min} \geq 3.5$) and using thermal energy (specific fan power $SPF_{min} \geq 1.15$); • seasonal efficiency of the air-to-air recuperators of ventilation and AC systems in heating mode $\eta_{r,min} \geq 70\%$; • efficiency of boilers (including steam boilers and boilers burning biomass at nominal and partial load) for calculating the integrated energy efficiency indicator of the building - minimum requirements are given depending on the type and capacity of the boilers and the average temperature of the heated water; • use of products in the buildings which must provide a high degree of environmental and health safety.	
03.07	National targets for renovation in connection to Long Term Renovation Strategy (number or percentage of buildings)		
03.08	National targets for renovation in connection to Long Term Renovation Strategy (expected reductions and relevant years)		

Key Implementation Decision – Energy Performance Certificates

<table>
<tr><th>no</th><th>Key Implementation Decision – Energy Performance Certificates</th><th>Description / value / response</th><th>Comment</th></tr>
<tr><td>04.01</td><td>Number of energy performance certificates per year (for instance average or values for of 3-5 years)</td><td>The total number of EPCs issued in 2017, 2018 and 2019 amounts respectively to 1,057,1,086 and 1,067.
Remark: Only EPCs issued for the whole building are included into the above statistics. (An EPC can be issued for a building unit as well.)</td><td></td></tr>
<tr><td>04.02</td><td>Number of EPCs since start of scheme</td><td>10,987 EPCs from 2010 through 2019
Remark: Only EPCs issued for the whole building are included into the above statistics. (An EPC can be issued for a building unit as well.)</td><td></td></tr>
<tr><td>04.03</td><td>Number of EPCs for different building types</td><td><table><tr><th>Category of buildings</th><th>Number of EPCs issued in the period 2017-2019</th></tr><tr><td>Residential building</td><td>1528</td></tr><tr><td>Offices</td><td>372</td></tr><tr><td>Educational buildings:</td><td>420</td></tr><tr><td>Buildings related to culture & arts</td><td>139</td></tr><tr><td>Hospitals</td><td>117</td></tr><tr><td>Hotels</td><td>130</td></tr><tr><td>Sports facilities</td><td>35</td></tr><tr><td>Wholesale and retail trade services buildings</td><td>277</td></tr><tr><td>Other types of energy-consuming buildings</td><td>192</td></tr></table></td><td></td></tr>
<tr><td>04.04</td><td>Number of assessors</td><td>286 assessors (companies) for all categories of buildings + 20 assessors (energy efficiency consultants, natural persons) for residential and mixed-use buildings of a low-rise development and country-house buildings</td><td></td></tr>
<tr><td>04.05</td><td>Basic education requirements for assessors</td><td>The assessors (the energy efficiency consultants) are required:
- to have secondary technical education, higher education or an acquired academic degree in field of Technical Sciences completed or recognised in Bulgaria or in another EU member state or in another state which is a party to the European Economic Area (EEA) Agreements or in Switzerland;
- to have acquired a length of service in the speciality after completion of the education - of not less than 6 years for holders of secondary technical education, not less than 3 years for holders of an educational qualification degree of Bachelor, and not less than 2 years for persons holding an educational qualification degree of Master or holding a science degree;</td><td></td></tr>
<tr><td>04.06</td><td>Additional training demands for assessors</td><td>Yes.
The assessors (the energy efficiency consultants) are required to hold a certificate of successfully passed exam for raising their qualification in higher education institutions teaching their students in specialities in the field of Technical Sciences, professional profiles of Energy, Electrical Equipment, Electronic Equipment and Automation and Architecture, Construction and Geodesy accredited in Bulgaria or in another EU member state or in a state which is a party to the EEA Agreement or in Switzerland.
Energy efficiency consultants attain qualification at two levels:
- Level 1: competent to perform the activities for all categories of buildings;</td><td></td></tr>
</table>

no	Key Implementation Decision – Energy Performance Certificates	Description / value / response	Comment
		- Level 2: competent to perform the activities for residential and mixed-use buildings of a low-rise development and country-house buildings; and the course involves 115 and 80 hours of tuition, respectively.	
04.07	Quality assurance system	The verification of energy audits and inspection reports is performed by the SEDA through systematic or random sampling of the audited buildings and the inspection reports. Control over the activity of the energy auditors is exercised by means of: • checking the validity of the input data of the building used to issue the EPC, as well as the results stated in the certificate; • checking the input data entered in the EPC and verifying the results, including the recommendations made for energy efficiency improvement; • a full check of data, results and measures prescribed for energy efficiency improvement by an on-site visit in order to verify the validity between the data stated in the EPC and the certified building. An independent random control was carried out on all the EPCs and inspection reports issued in 2015 and 2016. Up to the end of 2016, no fines / penalties had been imposed.	
04.08	National database for EPCs	Yes	
04.09	Link to national information on EPCs / Database	https://portal.seea.government.bg/bg/IndustrialSystemsReport	

Key Indicators & Decisions – Smart Buildings and Building Systems

no	Key Implementation Decision – Smart Buildings and Building Systems	Description / value / response	Comment
05.01	Is there a national definition of smart buildings?	No	
05.02	Are there current support systems for smart buildings?	No	
05.03	Are there currently specific requirements for technical building systems (for instance in building codes)?	Yes	
05.04	Are there current requirements for automatics (for instance in building codes)?	No	
05.05	Chosen option A or B for heating systems (inspection or other measures)	A	
05.06	Number of heating inspections; reports per year (if option A)	218 in the year 2017 204 in the year 2018 77 in the year 2019 Source: Database on the condition of the heating systems maintained by the SEDA	
05.07	Chosen option A or B for cooling systems (inspection or other measures)	A	
05.08	Number of air-conditioning / cooling system inspections; reports per year (if option A)	11 in the year 2017 92 in th3 year 2018 3 in the year 2019 Source: Database on the condition of the air-conditioning systems maintained by the SEDA	
05.09	Is there a national database for heating inspections?	Yes	
05.10	Is there a national database for cooling / air-conditioning inspections?	Yes	
05.11	Are inspection databases combined with EPC databases for registration of EPCs and inspection reports?	Yes *(Both databases are referenced one to another in order to cross information)*	
05.12	Link to national information on Inspection / Database	N/A (restricted access database)	

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