REPUBLIC OF BULGARIA

Ministry of Energy

NATIONAL LONG-TERM PROGRAMME

FOR THE PROMOTION OF INVESTMENTS IN MEASURES AIMED AT IMPROVING THE ENERGY PERFORMANCE OF THE NATIONAL STOCK OF PUBLIC AND PRIVATE RESIDENTIAL AND COMMERCIAL BUILDINGS

2016–2020

Sofia, June 2017

TABLE OF CONTENTS

ACRONYMS

AUER	Sustainable Energy Development Agency
FG	Financial grant
VAT	Value Added Tax
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
Commission	European Commission
EU	European Union
ESCO	Energy service companies
EC	European Community
ERDF	European Regional Development Fund
EFSI	European Fund for Strategic Investments
ZEE	Energy Efficiency Act
ZID	Act amending and supplementing another Act
ZUES	Condominium Management Act
ZUT	Spatial Planning Act
KEVR	Energy and Water Regulatory Commission
ME	Ministry of Energy
MRRB	Ministry of Regional Development and Public Works
CoM	Council of Ministers
MF	Ministry of Finance
NTEF	National Trust EcoFund
NPDEE	National energy efficiency action plan
NSI	National Statistical Institute
OPRG	Operational Programme ‘Regions in Growth’ 2014–2020
PPP	Public-private partnership
GFA	Gross floor area
AOs	Associations of owners
OSSU	Owner of a self-sustained unit
FEEVI	Energy Efficiency and Renewable Sources Fund

The National long-term programme for the promotion of investments in measures aimed at improving the energy performance of the national stock of public and private residential and commercial buildings is developed by a team of scientists at the Technical University of Sofia under a contract awarded by the institution primarily responsible for the development of the Programme, the Ministry of Regional Development and Public Works. The various scenarios developed by the scientific team are based on data valid as of 1 January 2016. The details related to policies and measures were updated by the Ministry of Energy and are valid as of 1 January 2017.

INTRODUCTION

Due to its cumulative effect on people's quality of life (health, comfort, wellbeing, purchasing power, self-esteem), energy efficiency has been identified as a lasting priority in Europe's development until 2020, as well as within a long-term time horizon until 2050.

In the Europe 2020 strategy, energy efficiency is a priority theme embedded in one of its seven flagship initiatives, Resource-efficient Europe. In combination with the renewable energy target, which is also expressed in quantitative terms, these two themes are regarded as key factors for sustainable growth and continuing development in Europe.

It is a proven fact that energy efficiency measures have an integrated impact, which is why the EU will staunchly support and encourage energy efficiency improvement policies over the next decades. The recent developments of Union law in the area of energy efficiency point to an increasing focus on cost efficiency. This important principle has also been set as a main requirement for the development and updating of the energy efficiency standards in the Member States.

EU's energy efficiency policies are laid out in Directive 2012/27/EU on energy efficiency and in Directive 2010/31/EU on the energy performance of buildings, in conjunction with the implementation of the requirements set out in Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products and its implementing regulations, Directive 2010/30/EU on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products, Regulation (EU) No 305/2011, the applicable EU standards, technical criteria, methods, and good European practices.

The National long-term programme for the promotion of investments in measures aimed at improving the energy performance of the national stock of public and private residential and commercial buildings (the Programme) is developed on the basis of Article 5(3)(4) of the Energy Efficiency Act (ZEE) with regard to the obligations of Member States, including Bulgaria, as per Article 4 of Directive 2012/27/EU. In accordance with § 20 of the ZEE Transitional and Final Provisions, the Programme shall be submitted to the European Commission as part of the plans referred to in Article 5(3)(1) of ZEE and updated every three years, as of 30 April 2014.

The Programme is a subject of implementation of a sectoral policy, but its realisation would not be possible without integration with other national goals and priorities. National documents which are binding on the implementation of the Programme include: National Energy Efficiency Action Plan 2014–2020; National Programme for Development: Bulgaria 2020; National Reform Programme (supporting the implementation of Europe 2020, updated 2014), Convergence Programme of Bulgaria 2014–2017; National Regional Development Strategy 2012–2022; National Spatial Development Concept 2013–2025; Partnership Agreement with the Republic of Bulgaria outlining the support from the EU Structural and Investment Funds for the 2014–2020 period; the Operational programmes for the programming period 2014–2020; the Third National Action Plan on Climate Change 2013–2020 and other applicable documents.

Implementation of the Programme will contribute to achieving the national objectives which Bulgaria will pursue in the coming years in order to enhance its growth potential. The main focus of the Programme is its contribution to the implementation of the National Programme for Development: Bulgaria 2020, a document which is fundamental to the country's development and to achieving the common European priorities for smart, sustainable and involving growth, and the growth and employment objectives, as formulated in the Europe 2020 strategy. In the context of the National Programme for Development: Bulgaria 2020, this Programme will contribute to the realisation of the national energy efficiency target for 2020.

Main objective:

Create a sustainable model for the management of energy efficiency in Bulgaria by applying efficient and integrated policies aimed at sustainable development, flexible financial mechanisms and successful practices with a view to achieving substantial energy savings at a national level for the sake of the people and their quality of life, reduction of carbon emissions in the atmosphere and conservation of the Bulgaria's energy resources.

Specific objectives:

1. Attracting private capital in order to increase energy efficiency by ensuring appropriate functioning of the internal market for energy efficiency services at the level of the end users of energy in buildings;
2. Increase the energy efficiency of the public and private stock of residential and commercial buildings in Bulgaria to a high national level of energy savings by applying large-scale measures aimed at improving the energy performance of buildings though cost-effective methods and highly efficient technologies;
3. Realise efficient national monitoring of the energy and environmental performance of buildings in Bulgaria by applying the achievements of Bulgarian science in combination with successful European and global practices in the area of energy efficiency of buildings;
4. Develop a national mechanism to promote sustainable end-user behaviour aimed at the efficient use of energy in buildings.

1. OVERVIEW OF THE NATIONAL BUILDING STOCK

For the purpose of calculating the energy costs and performance indicators, the national legislation adopts the following classification of building categories, depending on their intended use:

A. Residential:

a) single-family houses;

b) multifamily residential buildings (apartment blocks), which can be low-rise, medium-rise or high-rise;

c) mixed-use buildings;

d) social services buildings — resident-type;

B. Non-residential public buildings:

a) buildings intended for administrative services;

b) buildings intended for education and science;

c) buildings related to healthcare;

d) buildings related to hospitality;

e) buildings related to commerce, catering and services;

f) buildings intended for sport;

g) buildings related to culture and art;

h) other public buildings (as per the nomenclature in Regulation No 1 of July 2003 on the nomenclature of the types of structures).

A general assessment of the indicators used for the classification of buildings was undertaken for the purposes of the Programme. The more detailed classification provided in Regulation No 1 on the nomenclature of the types of structures in Bulgaria was used in order to identify the most appropriate distinguishing indicators when selecting reliable information about the two main categories — residential and non-residential buildings, as well as the subcategories of public buildings. The classification scheme is shown in Figure 1-1. The figure displays two levels of classification indicators — the first level is the functional use of the building and the second level includes specific indicators that distinguish the buildings by their structural type, spatial planning characteristics, age, ZUT category and type of heating/cooling system.

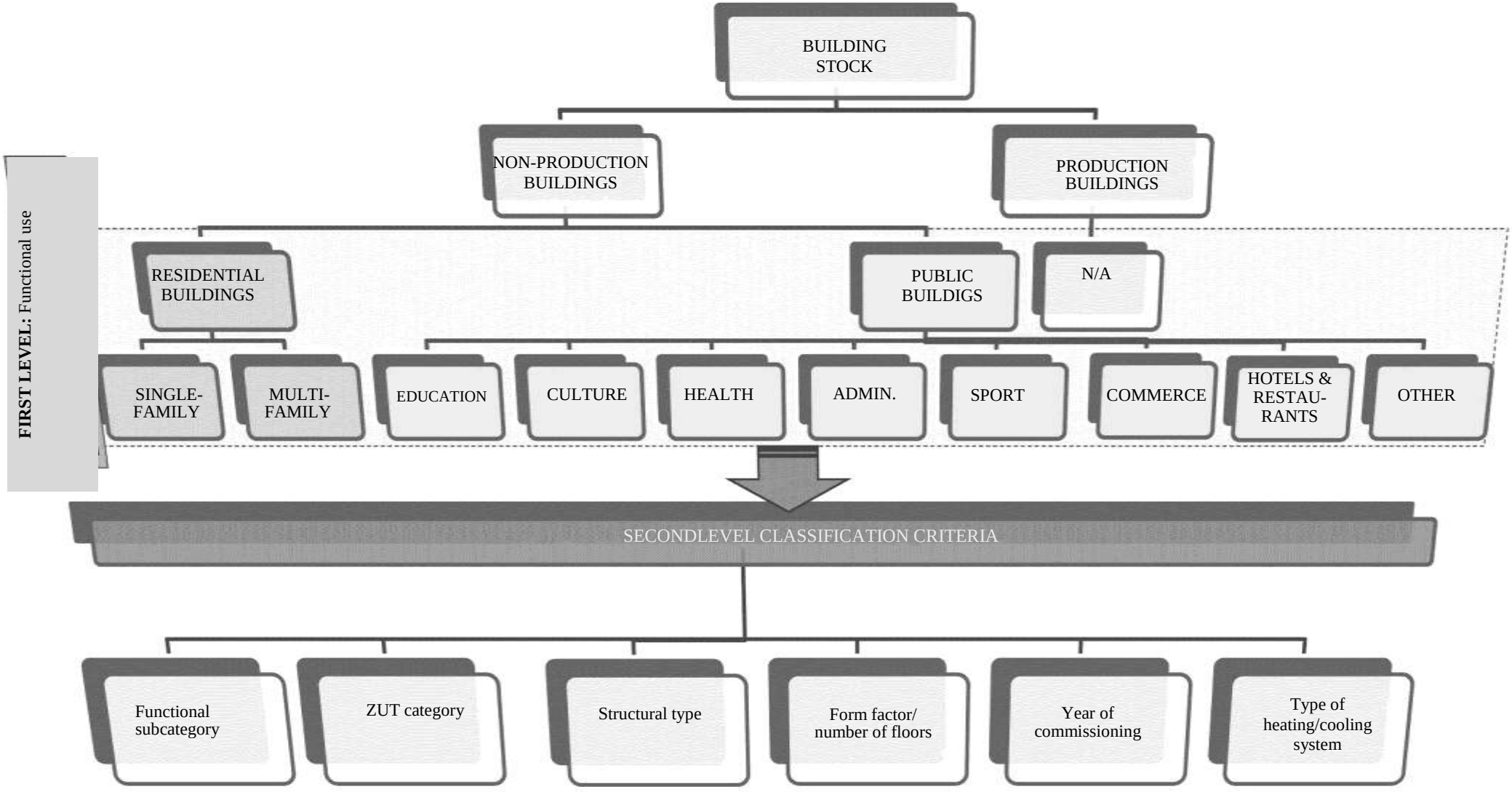


Figure 1-1: Classification[1] of the building stock

[1] *As per Regulation No 1 on the nomenclature of the types of structures in the Republic of Bulgaria*

A single database of the building stock of the entire public sector in Bulgaria is not available. After carrying out a research, the sources of information identified were mainly from projects of private organisations implemented in recent years. In these official publications it is possible to find more detailed information on the building stock in Bulgaria; however, the data are not confirmed by Bulgarian institutions. An example of such publication is 'Construction of nearly-zero energy buildings (nZEB) in Bulgaria: Towards a definition and road map', a report published in August 2012 by the Building Performance Institute Europe (BPIE) in collaboration with Ecofys Germany GmbH and EnEffect Bulgaria. The document indicates that *'The overall gross floor area of Bulgaria's building sector in 2010 is around 262 million m^2, including 212 million m^2 of gross floor area in the residential sector and 50 million m^2 in the non-residential sector.'* Since non-residential data are not confirmed, only official data provided by ministries and agencies has been used for the purposes of this Programme. This data was treated as a representative sample of the non-residential sector because the mechanism of its collection was realised by Bulgarian municipalities and public authorities, in accordance with the national arrangements for the certification of buildings and for reporting the results of the measures completed under the ZEE.

Assessment of non-residential buildings is based on data provided by the AUER, while assessment of residential buildings is based on statistical data provided by the NSI and systematically processed under Project No BG161PO001/5-01/2008/076 'Analysis, assessment and update of regulatory acts in support of OPRD 2014–2020' completed by the MRRB in 2013.

The database used for the purposes of the Programme was processed and analysed at the Centre for Energy Analysis, a research laboratory with the Technical University of Sofia. The laboratory also developed simulation models of energy consumption and scenarios for renovation of buildings by applying combinations of energy saving measures. The assessment of the existing building stock was supported by an energy profile of the buildings created with the following techniques:

- *Statistical approach* to assess the completeness and representativeness of the source data on buildings;
- *Systematic approach* to structure the database — creating a modular hierarchical structure of data sets in a specified sequence and by specified criteria (developing a system of parameters);
- *Statistical analysis* to identify the statistical distribution of characteristics of the building sector;
- *Comparative analysis* of the energy performance of existing buildings.

The *systematic approach* was applied in order to make a reliable classification in several consecutive steps:

- ✓ identification of alternative and complementary databases, available in Bulgaria for the purposes of the Programme;
- ✓ review and verification of the quality and reliability of the information contained in the databases;
- ✓ determining indicators and criteria for creating representative data sets on the buildings in the various subcategories;
- ✓ hierarchical processing of the data in order to identify representative groups of buildings.

The *statistical analysis* phase included:

- visual approach to data mining from the databases in regard to the buildings in which energy savings measures have already been implemented;
- use of specific selection techniques;
- visualisation of multidimensional data to reduce dataset sizes down to reliable samples for each assessment indicator.

The building stock data, which describes the buildings on which information is available, is structured in accordance with the following *system of assessment indicators*:

- ✓ categorisation of the buildings in accordance with the regulatory framework;
- ✓ distribution by *year of commissioning*. The approach used is for a distribution between two consecutive changes in the constructional/technical standards;
- ✓ distribution by *type of the heating/cooling system*;
- ✓ distribution by *GFA of the building*;
- ✓ distribution by *structural type*;
- ✓ distribution by *functional use*.

The assessment was performed successively for the two main groups: *non-residential* and *residential buildings*. Due to a lack of sufficiently reliable data, the *structural type* criterion was not applied to non-residential buildings.

1.1 Overview and classification of public (non-residential) buildings

An analysis was made of data on 9 555 buildings (valid as of 1 January 2016), for which AUER contains information about the basic technical parameters. These buildings include the identification of a sample of 8 611 buildings with combined GFA of 16 524 753 m^2, about which there is sufficiently reliable data. The database does not include information on the form of ownership of 710 buildings with combined GFA of 963 380 m^2. The basic set, following data systematisation, is presented in Table 1.1-1.

Table 1.1-1 Basic dataset for analysis of public buildings, distributed by GFA and functional subcategory

Functional subcategory	***Indicator***	***Total***	***from 250 to 1 000 m^2***	***from 1 000 to 5 000 m^2***	***from 5 000 to 10 000 m^2***	***over 10 000 m^2***
Administrative	count	2 393	1 548	736	83	26
	GFA, m^2	3 296 490	80 9434	1 444 876	548 147	494 033
Hospital	count	66	12	25	16	13
	GFA, m^2	380 488	7 240	76 091	114 323	182 835
Kindergarten/nursery	count	1 326	609	709	8	0
	GFA, m^2	1 747 051	354 038	1 346 205	46 809	0
Social home	count	185	110	68	6	1
	GFA, m^2	236 447	58 880	125 614	40 856	11 097
Building related to culture and art	Count	322	191	107	18	6
	GFA, m^2	516 668	100 754	213 756	120 568	81 589
Boarding house	count	315	65	161	74	15
	GFA, m^2	1 284 221	39 794	431 630	545 372	267 424
School	count	2 125	706	1 093	274	52
	GFA, m^2	5 665 360	409 704	2 591 295	1 923 298	741 067
Community centre	count	688	432	251	5	0
	GFA, m^2	717 457	253 176	434 397	29 884	0
Outpatient clinic	count	242	178	52	10	2
	GFA, m^2	331 008	82 346	110 697	67 763	70 203
University/college	count	288	54	140	64	30
	GFA, m^2	1 427 077	33 653	369 895	448 571	574 958
Sport building	count	143	57	72	10	4
	GFA, m^2	291 167	29 579	144 007	66 440	51 141

Functional subcategory	*Indicator*	*Total*	*from 250 to 1 000 m²*	*from 1 000 to 5 000 m²*	*from 5 000 to 10 000 m²*	*over 10 000 m²*
Building related to commerce or hospitality	count	118	74	34	7	3
	GFA, m²	188 736	37 015	65 491	48 656	37 574
Building related to transport	count	8	6	2	0	0
	GFA, m²	5 409	2 495	2 914	0	0
Other	count	392	267	111	14	0
	GFA, m²	437 173	128 687	212 651	95 836	0
Total	***count***	***8 611***	***4 309***	***3 561***	***589***	***152***
	GFA, m2	***16 524 757***	***2 346 795***	***7 569 518***	***4 096 520***	***2 511 921***

In the next data processing phase, an assessment was made under the criteria 'renovated GFA' for improvement of the energy performance of buildings and 'non-renovated GFA'.

Table 1.1-2 Public buildings[2] with renovated and non-renovated GFA as of 1 January 2016 (based on a sample of 8 611 buildings)

Indicator	*With renovated GFA*	*With non-renovated GFA*	*Total*
Public buildings owned by the State			
count	1 073	1 222	2 295
m²	3 289 347	3 039 026	6 328 373
Public buildings owned by municipalities			
count	2 491	3 825	6 316
m²	4 854 922	5 341 458	10 196 380

The graphic representation of the characteristics of the public buildings by selected indicators in regard to the sample of 8 611 buildings is given in Figures 1.1-1 to 1.1-12.

[2] *The buildings of the Ministry of Defense are not included*

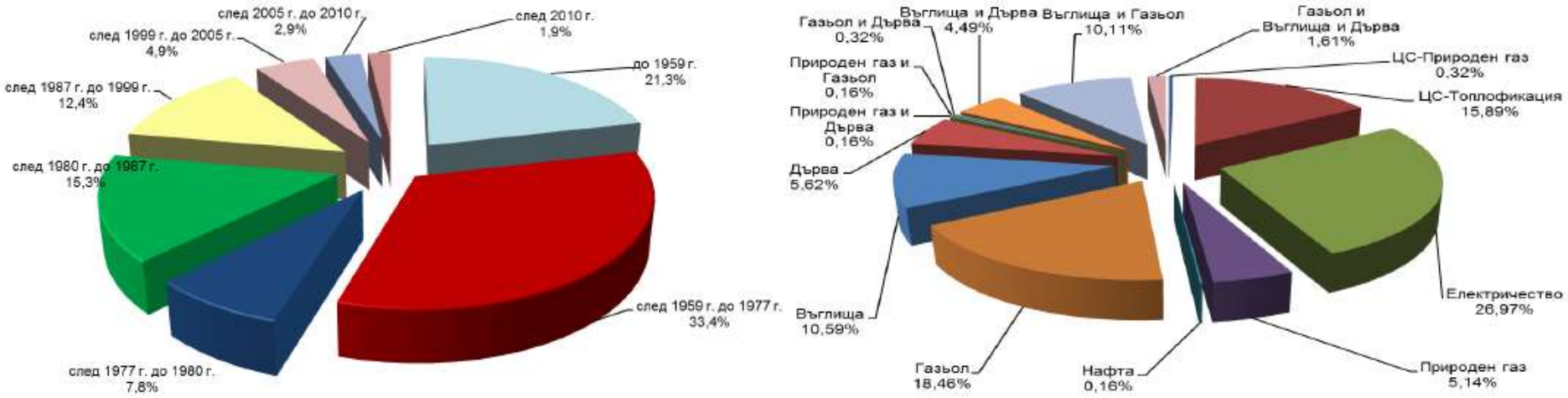


Figure 1-1.1: Administrative buildings. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 21.3 %; 1959–1977: 33.4 %; 1977–1980: 7.8 %; 1980–1987: 15.3 %; 1987–1999: 12.4 %; 1999–2005: 4.9 %; 2005–2010: 2.9 %; 2010 onwards: 1.9 %

Heating/cooling system: Electricity: 26.97 %; District heating (other than natural gas): 15.89 %; District heating (natural gas): 0.32 %; Gasoil, firewood and coal: 1.61 %; Coal and gasoil: 10.11 %; Coal and firewood: 4.49 %; Gasoil and firewood: 0.32 %; Natural gas and gasoil: 0.16 %; Natural gas and firewood: 0.16 %; Firewood: 5.62 %; Coal: 10.59 %; Gasoil 18.46 %; Heating oil: 0.16 %; Natural gas: 5.14 %

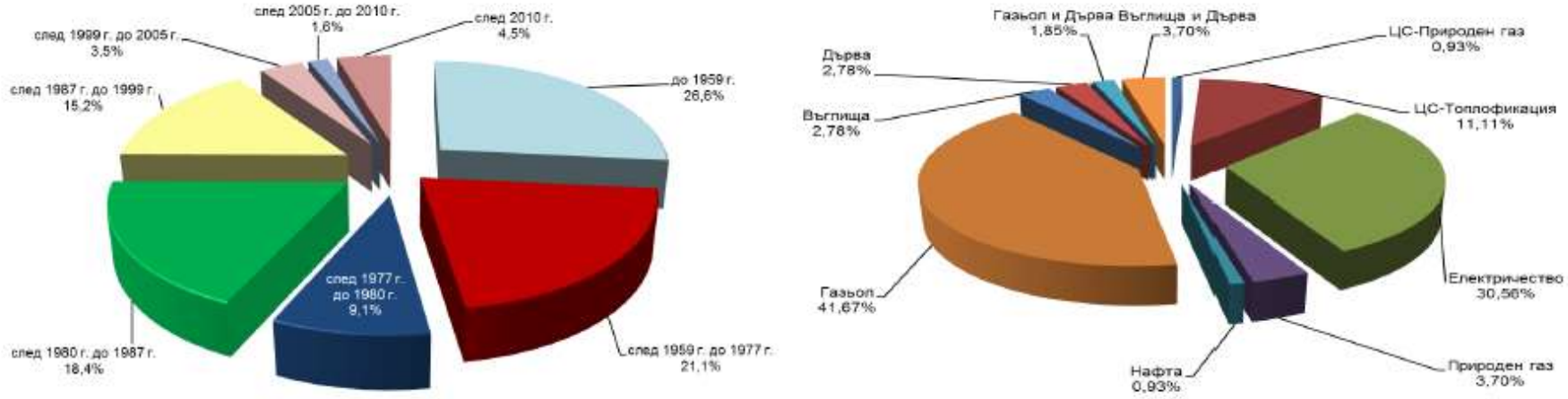


Figure 1.1-2: Multi-profile hospitals for acute treatment. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 26.6 %; 1959–1977: 21.1 %; 1977–1980: 9.1 %; 1980–1987: 18.4 %; 1987–1999: 15.2 %; 1999–2005: 3.5 %; 2005–2010: 1.6 %; 2010 onwards: 4.5 %

Heating/cooling system: Electricity: 30.56 %; District heating (other than natural gas): 11.11 %; District heating (natural gas): 0.93 %; Firewood and coal: 3.70 %; Gasoil and firewood: 1.85 %; Firewood: 2.78 %; Coal: 2.78 %; Gasoil 41.67 %; Heating oil: 0.93 %; Natural gas: 3.70 %

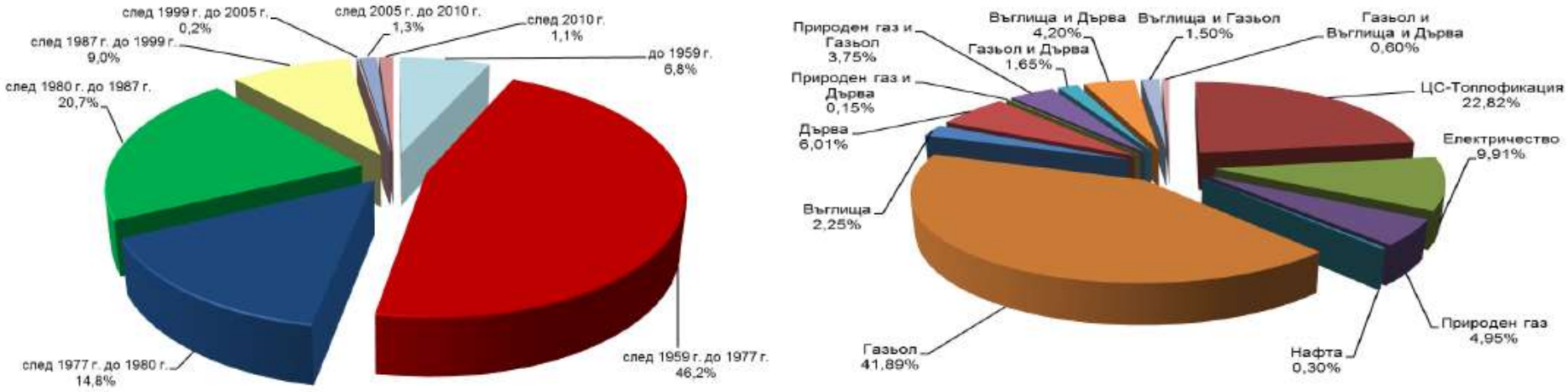


Figure 1.1-3: Kindergartens and nurseries. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 6.8 %; 1959–1977: 46.2 %; 1977–1980: 14.8 %; 1980–1987: 20.7 %; 1987–1999: 9.0 %; 1999–2005: 0.2 %; 2005–2010: 1.3 %; 2010 onwards: 1.1 %

Heating/cooling system: Electricity: 9.91 %; District heating (other than natural gas): 22.82 %; Gasoil, firewood and coal: 0.60 %; Coal and gasoil: 1.50 %; Coal and firewood: 4.20 %; Gasoil and firewood: 1.65 %; Natural gas and gasoil: 3.75 %; Natural gas and firewood: 0.15 %; Firewood: 6.01 %; Coal: 2.25 %; Gasoil 41.89 %; Heating oil: 0.30 %; Natural gas: 4.95 %

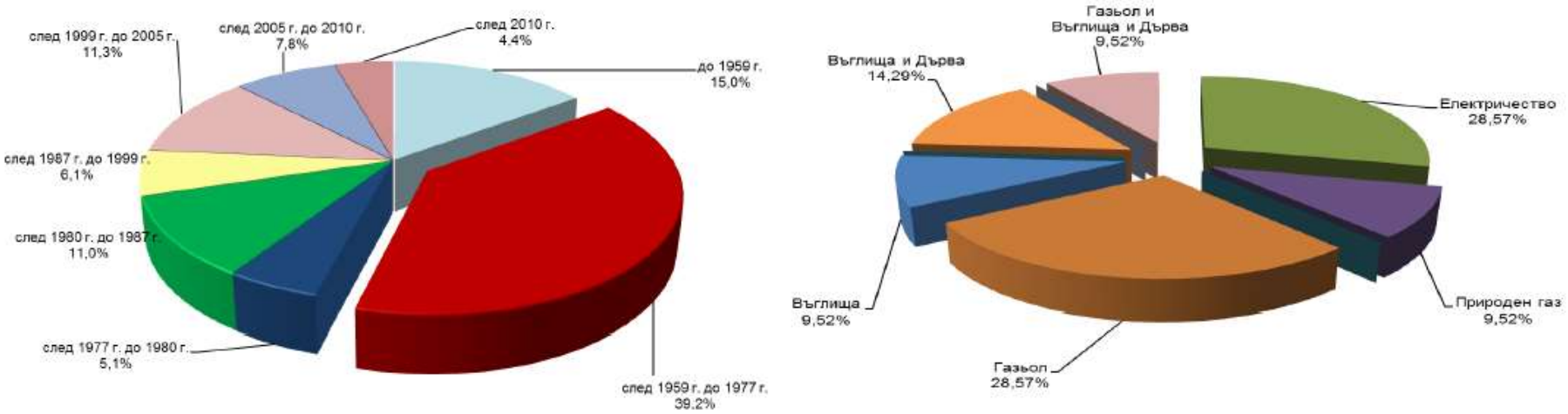


Figure 1.1-4: Social homes. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 15.0 %; 1959–1977: 39.2 %; 1977–1980: 5.1 %; 1980–1987: 11.0 %; 1987–1999: 6.1 %; 1999–2005: 11.3 %; 2005–2010: 7.8 %; 2010 onwards: 4.4 %

Heating/cooling system: Electricity: 28.57 %; Gasoil, firewood and coal: 9.52 %; Coal and firewood: 14.29 %; Coal: 9.52 %; Gasoil: 28.57 %; Natural gas: 9.52 %

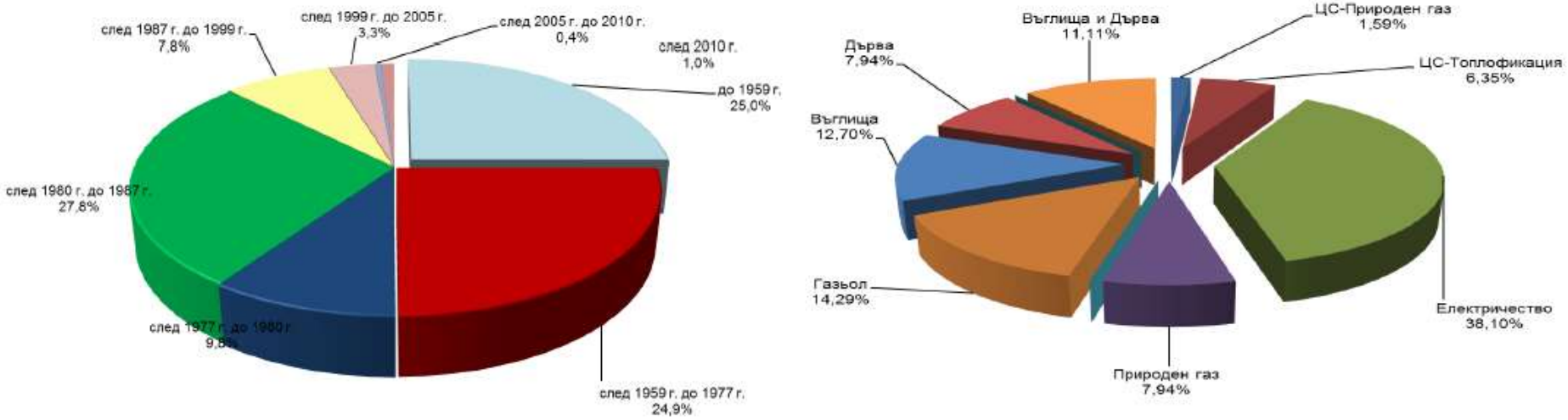


Figure 1.1-5: Buildings related to culture and art. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 25.0 %; 1959–1977: 24.9 %; 1977–1980: 9.8 %; 1980–1987: 27.8 %; 1987–1999: 7.8 %; 1999–2005: 3.3 %; 2005–2010: 0.4 %; 2010 onwards: 1.0 %

Heating/cooling system: Electricity: 38.10 %; District heating (other than natural gas): 6.35 %; District heating (natural gas): 1.59 %; Coal and firewood: 11.11 %; Firewood: 7.94 %; Coal: 12.70 %; Gasoil 14.29 %; Natural gas: 7.94 %

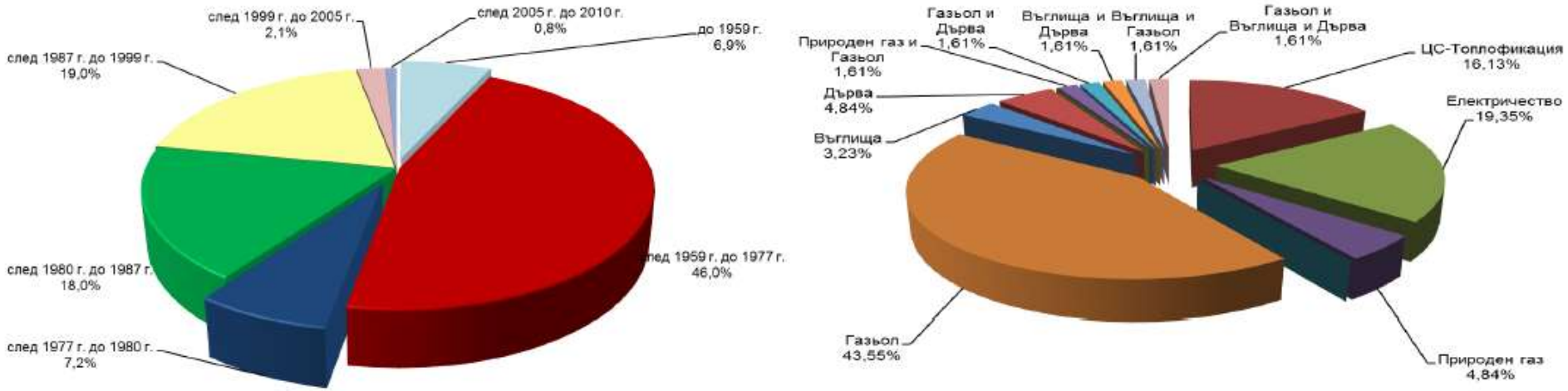


Figure 1.1-6: Boarding houses. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 6.9 %; 1959–1977: 46.0 %; 1977–1980: 7.2 %; 1980–1987: 18.0 %; 1987–1999: 19.0 %; 1999–2005: 2.1 %; 2005–2010: 0.8 %

Heating/cooling system: Electricity: 19.35 %; District heating (other than natural gas): 16.13 %; Gasoil, firewood and coal: 1.61 %; Coal and gasoil: 1.61 %; Coal and firewood: 1.61 %; Gasoil and firewood: 1.61 %; Natural gas and gasoil: 1.61 %; Firewood: 4.84 %; Coal: 3.23 %; Gasoil 43.55 %; Natural gas: 4.84 %

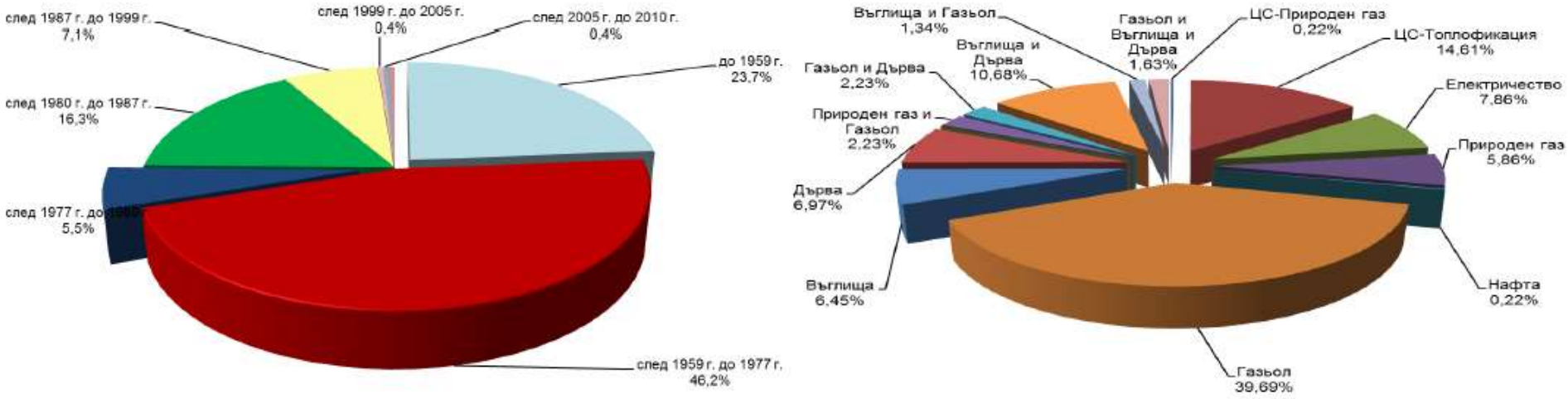


Figure 1.1-7: Schools. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 23.7 %; 1959–1977: 46.2 %; 1977–1980: 5.5 %; 1980–1987: 16.3 %; 1987–1999: 7.1 %; 1999–2005: 0.4 %; 2005–2010: 0.4 %

Heating/cooling system: Electricity: 7.86 %; District heating (other than natural gas): 14.61 %; District heating (natural gas): 0.22 %; Gasoil, firewood and coal: 1.63 %; Coal and gasoil: 1.34 %; Coal and firewood: 10.68 %; Gasoil and firewood: 2.23 %; Natural gas and gasoil: 2.23 %; Firewood: 6.97 %; Coal: 6.45 %; Gasoil 36.69 %; Heating oil: 0.22 %; Natural gas: 5.86 %

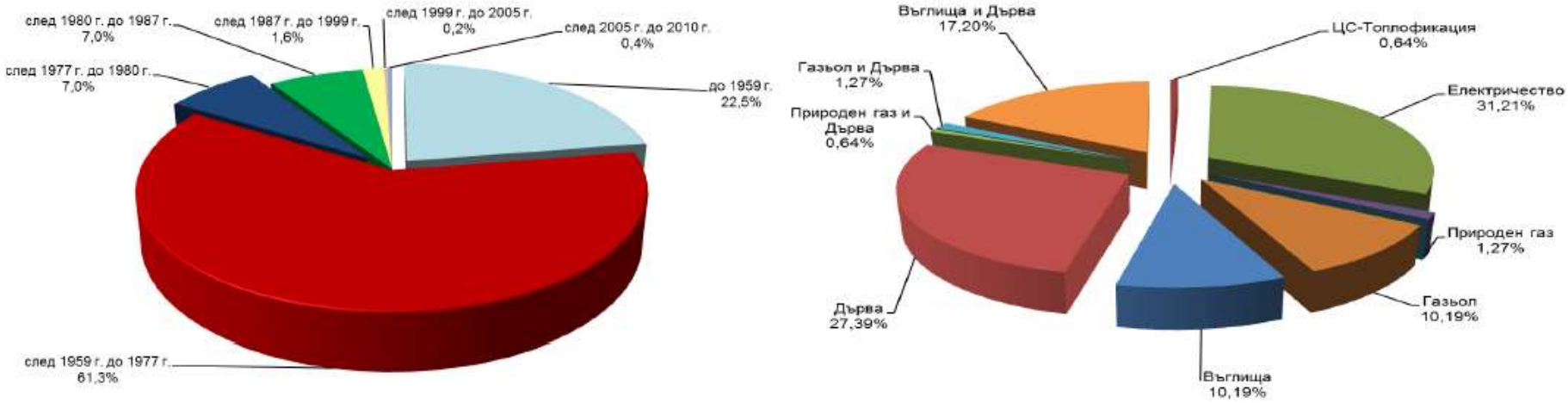


Figure 1.1-8: Community centres. Distribution by year of commissioning and source of heating and/or cooling

Key:
Year of commissioning: before 1959: 22.5 %; 1959–1977: 61.3 %; 1977–1980: 7.0 %; 1980–1987: 7.0 %; 1987–1999: 1.6 %; 1999–2005: 0.2 %; 2005–2010: 0.4 %

Heating/cooling system: Electricity: 31.21 %; District heating (other than natural gas): 0.64 %; Coal and firewood: 17.20 %; Gasoil and firewood: 1.27 %; Natural gas and firewood: 0.64 %; Firewood: 27.39 %; Coal: 10.19 %; Gasoil: 10.19 %; Natural gas: 1.27 %

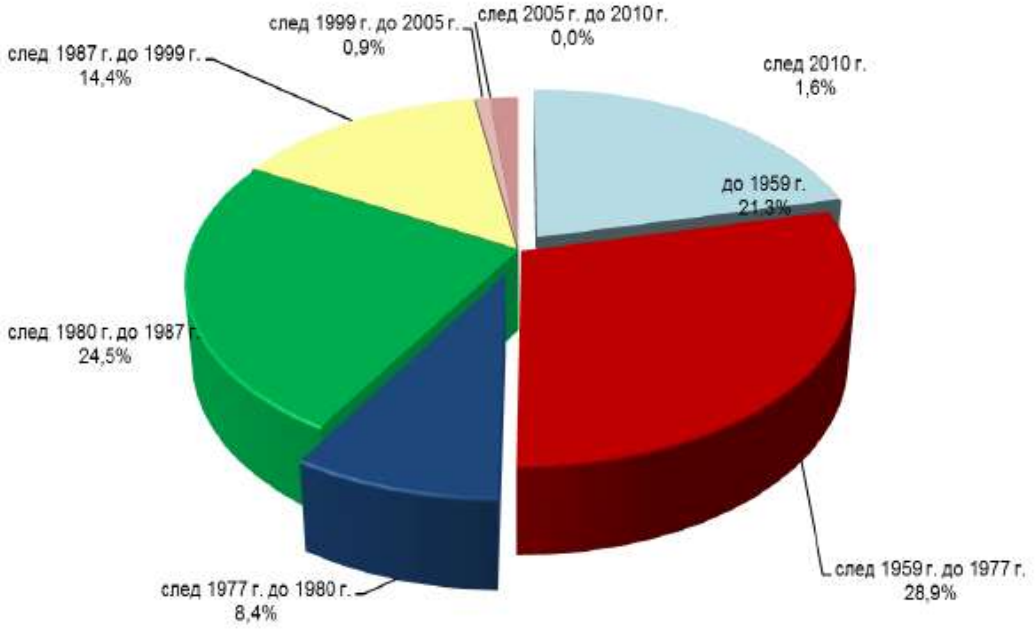


Figure 1.1-9: Outpatient clinics. Distribution by year of commissioning

Key:
Year of commissioning: before 1959: 21.3 %; 1959–1977: 28.9 %; 1977–1980: 8.4 %; 1980–1987: 24.5 %; 1987–1999: 14.4 %; 1999–2005: 0.9 %; 2005–2010: 0.0 %; 2010 onwards: 1.6 %

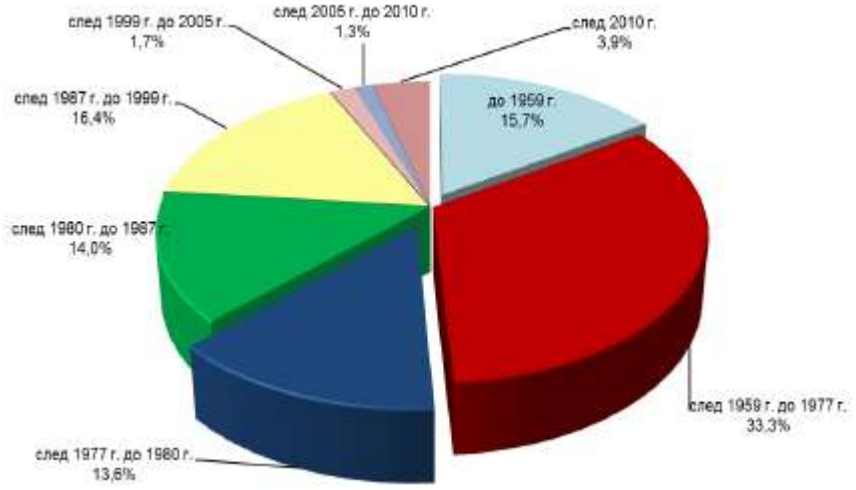


Figure 1.1-10: Universities/colleges. Distribution by year of commissioning

Key:
Year of commissioning: before 1959: 15.7 %; 1959–1977: 33.3 %; 1977–1980: 13.6 %; 1980–1987: 14.0 %; 1987–1999: 16.4 %; 1999–2005: 1.7 %; 2005–2010: 1.3 %; 2010 onwards: 3.9 %

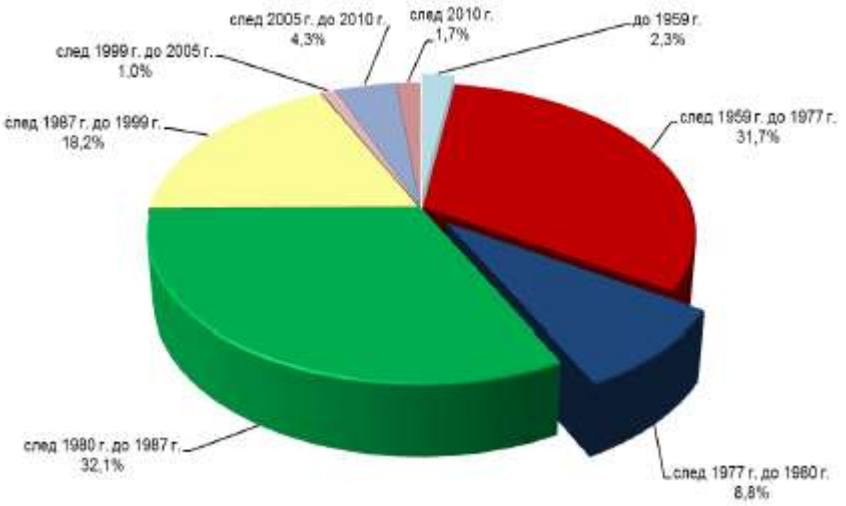


Figure 1.1-11: Buildings intended for sport. Distribution by year of commissioning

Key:
Year of commissioning: before 1959: 2.3 %; 1959–1977: 31.7 %; 1977–1980: 8.8 %; 1980–1987: 32.1 %; 1987–1999: 18.2 %; 1999–2005: 1.0 %; 2005–2010: 4.3 %; 2010 onwards: 1.7 %

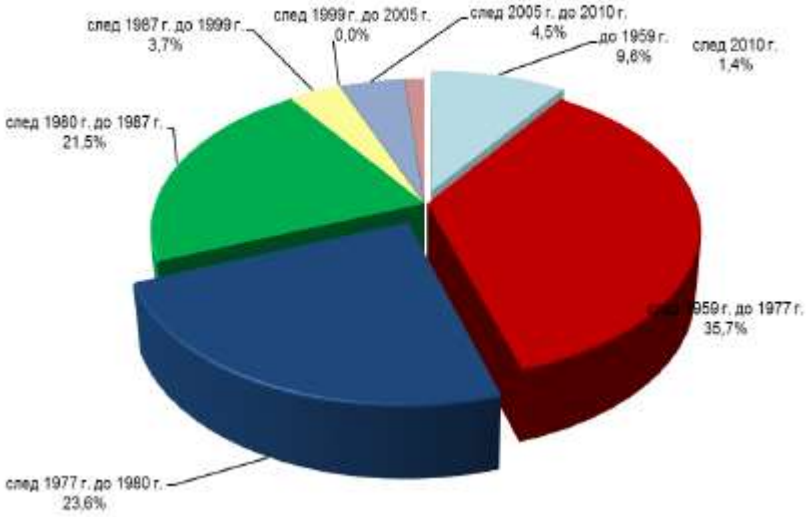


Figure 1.1-12: Buildings related to commerce or hospitality. Distribution by year of commissioning

Key:
Year of commissioning: before 1959: 9.6 %; 1959–1977: 35.7 %; 1977–1980: 23.6 %; 1980–1987: 21.5 %; 1987–1999: 3.7 %; 1999–2005: 0.0 %; 2005–2010: 4.5 %; 2010 onwards: 1.4 %

1.2 Overview and classification of residential buildings in Bulgaria

The analysis was prepared on the basis of official data of the NSI. Eurostat data has been used for the comparisons with other European countries in regard to the indicators monitored at EU level.

The data reflects the current status of the residential sector at the time of the 2011 Census of population and housing which was carried out in compliance with the requirements laid down in Regulation (EC) No 763/2008 of the European Parliament and of the Council on population and housing censuses.

Two groups of status assessment indicators were used for the purposes of the analyses:

- *Technical indicators* were used to assess the overall technical repair and performance of the buildings, the measures to achieve and maintain the essential requirements to the buildings (load-bearing capacity, safe use, fire safety, energy efficiency, hygiene, protection of human life and health, soundproofing, environmental protection, accessibility), as well as to assess their cost-efficiency. The technical indicators and their parameters are strongly influenced by the state of art at the time of construction of the building and the period during which the buildings has been used, user behaviour, cultural, social, and moral characteristics of the inhabitants, as well as their financial capabilities and the quality of life in the buildings.

- Indicators related to the current status of the European Union Statistics on *Income and Living Conditions* (EU-SILC); they are characterised by a dataset that register the status of target variables specified at EU level in a standardised manner to enable benchmarking and assessment of growth and social exclusion.

The values studied and the development trends of these indicators are variable; therefore, the analytical data provided should be considered as a snapshot of the existing status. Nevertheless, development patterns can be observed with certain parameters.

1.2.1 Overall assessment of the housing stock

According to the census from 1 February 2011, there were 3 887 149 residential units in Bulgaria, including 3 839 342 (98.8 %) in residential buildings, 22 103 (0.6 %) in student boarding houses, 21 339 (0.5 %) in non-residential buildings, 818 collective housing units and 3 547 (0.1 %) primitive and mobile units. As at 1 February 2012, 65.9 % of the residential units in Bulgaria had two or three rooms.

In 2011, the NSI identified five main structural types of residential buildings:

- *Panel buildings* — made of panels (prefabricated building elements);
- *Reinforced concrete buildings* (reinforced concrete structure with slabs and columns) — for massive monolithic buildings (with reinforced concrete slabs (MSB), large-size formwork (EPK), lift-slabs (PPP), climbing formwork (PK), skeleton–frame buildings, beamless-skeleton buildings, special structure buildings, etc.);

- *Brick buildings* (with concrete slabs) — buildings having brick walls and concrete slabs between the floors, but not having reinforced concrete columns;
- *Brick buildings with trimmer joists without reinforced concrete* — buildings having brick walls and concrete slabs between the floors, but not having reinforced concrete columns;
- *Other* — buildings made of stone, clay, timber, wooden boards or chipboards.

In the statistical information from the 2011 census, the 'other' group was further subdivided in accordance with the methodology of the NSI.

Reinforced concrete buildings have a load bearing frame structure and floors of reinforced concrete, with walls made of panels, bricks or other materials.

Monolithic buildings have load bearing walls of brickwork or stonework and girders, beams and floors of reinforced concrete, but they do not have reinforced concrete columns. Monolithic buildings also include buildings where only the floor structure is made of prefabricated elements.

Residential buildings are those initially built or subsequently reconstructed to be permanently occupied by one or more households. The scope of the survey includes inhabited and uninhabited residential buildings, summer kitchens (if they are standalone units), boarding houses, guesthouses, monasteries and retirement homes inhabited by collective households.

A residential unit is a differentiated and structurally individualised space initially built or subsequently reconstructed for residential occupancy, which consists of one or more rooms (living or service spaces) and has one or more independent exits to a common area (staircase, yard or directly to a street), regardless of whether it has a purpose-built kitchen. A residential unit is also any standalone space (room) that is not connected to other spaces, has an independent exit to a common area (staircase, yard or directly to a street), and is used both as a kitchen and for accommodation or only for accommodation.

The number of residential units includes inhabited and uninhabited but inhabitable residential units: boarding houses, guesthouses, monasteries, retirement homes occupied by collective households, summer kitchens, provided that they are standalone buildings, and residential units in non-residential buildings (administrative, business and other buildings such as schools, hospitals, hotels and military barracks), provided that they are permanently occupied by households.

A residential unit with two or three floors located in one residential building and occupied by a single household is considered as one residential unit. If each floor of such a building is occupied by a single household, each floor is considered a separate residential unit.

In hotel-type buildings (corridor system) the rooms inhabited by separate households are considered standalone residential units. In the case of buildings inhabited by collective households (guesthouses, specialised homes, monasteries, prisons, etc.) all rooms occupied by persons belonging to the collective household and all service rooms used by these persons constitute one residential unit.

When the residential units are assigned to groups based on the number of rooms, a room is also any living room with natural light, excluding vestibules, kitchens and rooms with an area below 4 m^2.

The *living space area* includes the area of living rooms, bedrooms, sleeping quarters, dining rooms, day rooms, rooms used by scholars as work offices and libraries, guest rooms and living rooms.

The *service space area* includes the area of service spaces, rooms and kitchens with an area below 4 m^2, vestibules with a portal or other partition, corridors, hallways, bathrooms, toilets, combined bathrooms and toilets, larders, walk-in closets and other service spaces (drying rooms, laundry rooms, balconies and loggias) regardless of their area. Kitchen areas include kitchens with an area above 4 m^2.

The *useful area* of a residential unit is the sum total of the living, service and kitchen areas.

Primitive residential units include those located in basements or attics of residential buildings, cabins (assembled from individual wooden boards), huts, buildings for which there is a prohibition to reside in, buildings under construction occupied by workers finishing the construction of the building, etc.

1.2.2 Statistical review by technical indicators of residential buildings

The technical indicators provide accurate information for assessing the overall technical condition of buildings, the level of ammortisation and the potential for improvement of the technical characteristics of the buildings. In Bulgaria, the values of the technical indicators of buildings are established by audits of the technical characteristics of the buildings, pursuant to Regulation No 5 of 2006 on the technical passports of construction sites, and by energy efficiency audits carried out in accordance with Article 48 of the ZEE.

The statistical review was made in accordance with indicators which can be assessed on the basis of statistical data only. Consolidated results are provided in Table 1.2.2-1.

Table 1.2.2-1: Consolidated data on residential buildings by structural type

No.	Structural type	until 2001				until 2011		
		Residential units, count	Useful area m^2	Buildings, count	Spec. area of the building, m^2	Residential units, count	Useful area m^2	Buildings, count
1	Prefabricated panels	707 441	43 859 858.00	18 900	2 321	710 733	50 243 904	21 651
2	Reinforced concrete (MSB, EPK, PPP, PK)	441 892	31 171 701.00	75 333	414	413 179	21 053 819	50 881
3	Bricks (with a concrete slab) (MSB)	1 025 700	71 511 409.00	578 938	124	1 432 107	87 286 119	706 646
4	Bricks (with trimmer joist) (metal joists)	1 049 355	63 577 389.00	997 775	64	984 578	60 047 857	942 383
5	Stonework	103 652	6 312 322.00	95 306	66	86 261	0	
6	Clay (unbaked bricks)	287 389	14 517 351.00	294 887	49	223 948	0	
7	Timber	39 926	1 391 265.00	39 810	35	24 476	0	
8	Other	23 086	1 002 815.00	23 584	43	8 215	14 553 531	342 267
9	Total for the country	3 678 441	233 344 110	2 124 533		3 887 149	233 185 230	2 042 177

Analysis by structural type

This technical indicator is relevant for the assessment of the overall technical condition and ammortisation period of the building structure, as well as for the assessment of the energy performance of existing residential buildings. The indicator is also used to assess cost-effectiveness in the process for energy and technical audits. The indicator is used to assess the technical standards under which the buildings were constructed and commissioned, and to assess any deviation from the current technical standards.

Figure 1.2.2-1 presents the distribution of useful living area by structural type.

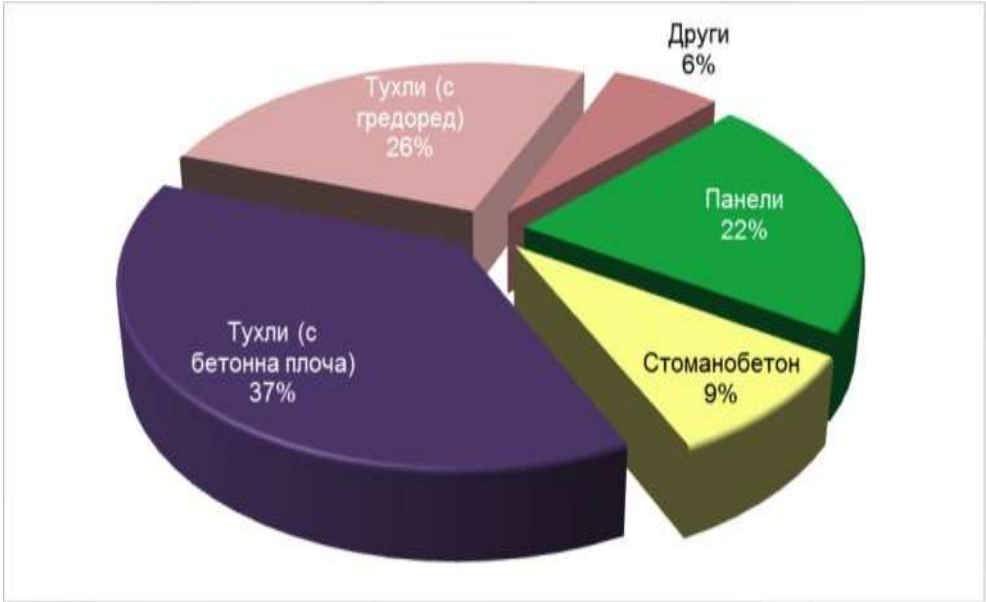


Figure 1.2.2-1: Distribution of useful living area in 2011 by structural type

Key: bricks (with concrete slabs) 37 %, bricks (with trimmer joists) 26 %, panel buildings 22 %, reinforced-concrete buildings 9 %, other 6 %.

The data analysis demonstrated that four structural types are prevalent:

- Panels — prefabricated panels for residential units;
- Reinforced concrete — monolithic reinforced concrete structures, large-area formwork, lift-slabs, climbing formwork (MSB, EPK, PPP, PK);
- Brickwork (with concrete slabs) (MSB); and
- Brickwork (with trimmer joists) (metal joists),

which account for 93.8 % of the combined useful area of residential units as of 2011, an increase of 3.3% since 2001. Due to their prevalence, the following analysis of indicators focuses on these four groups.

Analysis by number of floors

The indicator reviewed is a technical one and it is relevant when assessing the application of the Condominium Management Act (ZUES), when assessing the costs related to building maintenance and management, as well as when assessing the applicable measures for energy efficiency of buildings.

Figure 1.2.2-2 presents the distribution of panel buildings by number of floors.

Residential buildings (count):	21 651
Combined useful area (m^2):	50 243 904
Residential units (count):	710 733

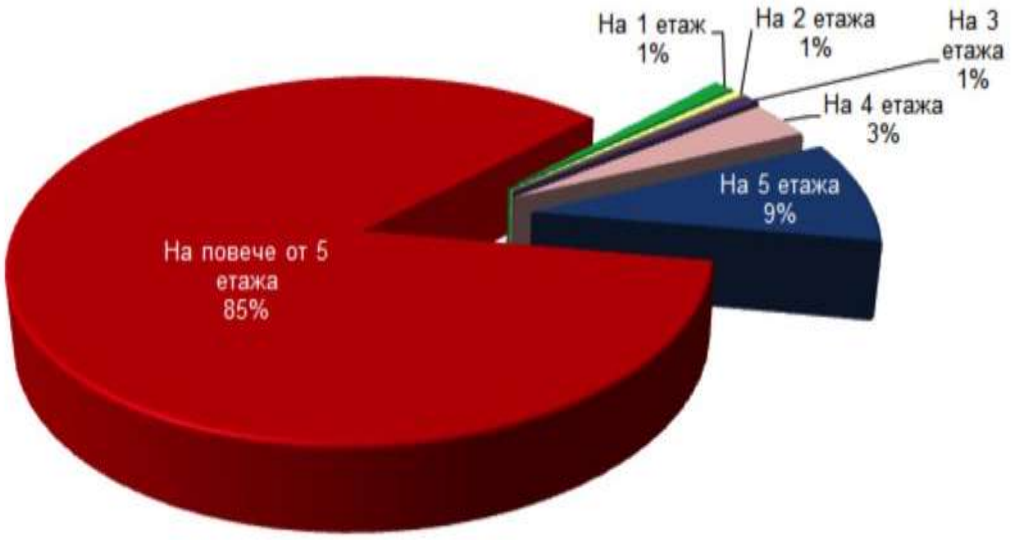


Figure 1.2.2-2: Distribution of residential panel buildings by number of floors

Key: more than 5 floors: 85 %, 5 floors: 9 %, 4 floors: 3 %, 3 floors: 1 %, 2 floors: 1 % and 1 floor: 1 %.

More than 85 % of the panel buildings have more than 5 floors. These buildings are occupied by families of diverse social and cultural status, which largely prevents the maintenance of their common areas. The energy performance of building envelopes and heating systems in these buildings is poor.

Figure 1.2.2-3 presents the distribution of reinforced concrete buildings by number of floors.

Residential buildings (count):	50 881
Combined useful area (m^2):	21 053 819
Residential units (count):	413 179

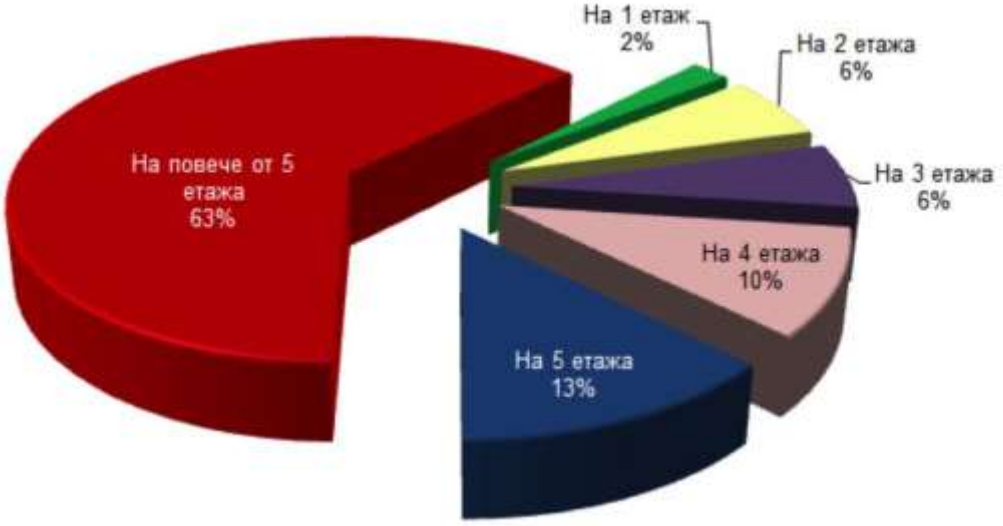


Figure 1.2.2-3: Distribution of reinforced concrete residential buildings by number of floors

Key: more than 5 floors 63 %, 5 floors 13 %, 4 floors 10 %, 3 floors 6 %, 2 floors 6 % and 1 floor 2 %.

Figure 1.2.2-4 presents the distribution of brickwork buildings (with concrete slabs) by number of floors.

Residential buildings (count):	706 646
Combined useful area (m^2):	87 286 119
Residential units (count):	1 432 107

Figure 1.2.2-4: Distribution of brickwork buildings (with concrete slabs) by number of floors

Key: more than 5 floors 18 %, 5 floors 10 %, 4 floors 10 %, 3 floors 12 %, 2 floors 33 % and 1 floor 17 %.

Figure 1.2.2-5 presents the distribution of brickwork buildings (with trimmer joists) by number of floors.

Residential buildings (count):	942 383
Combined useful area (m^2):	60 047 857
Residential units (count):	984 578

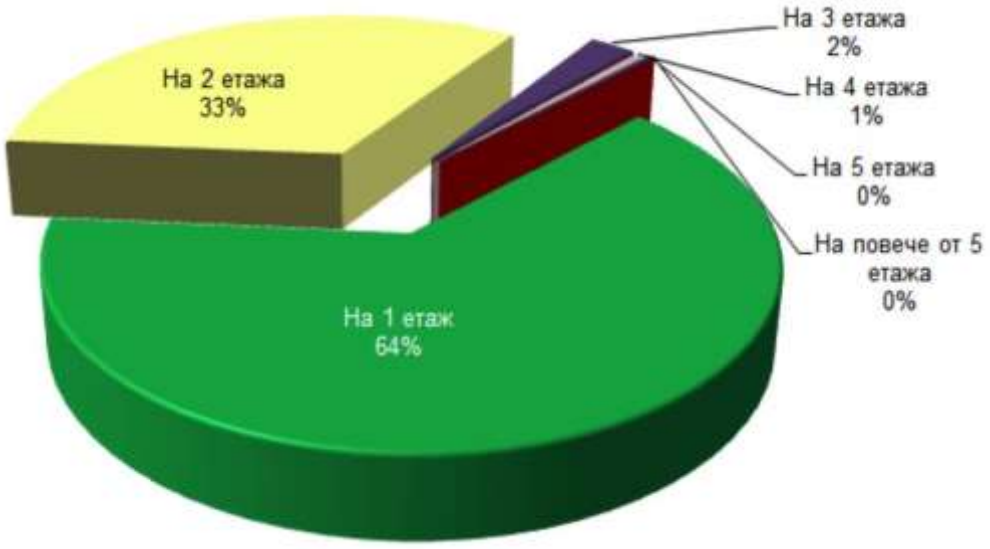


Figure 1.2.2-5: Distribution of brickwork buildings (with trimmer joists) by number of floors

Key: more than 5 floors 0 %, 5 floors 0 %, 4 floors 1 %, 3 floors 2 %, 2 floors 33 % and 1 floor 64 %.

Analysis by age (year of commissioning)

This indicator is relevant when assessing the overall operational condition of the residential building stock, when drafting programmes for the renovation of existing residential buildings, and when planning the financial parameters of these programmes. At building level, the impact of this indicator on the costs related to the building and the individual residential units in it are variable since the indicator is strongly influenced by subjective factors: management level, user behaviour, social status of the owners, extent and quality of renovations carried out in the buildings, climatic factors in the area, etc.

Figure 1.2.2-6 presents the distribution of residential buildings in Bulgaria by year of construction.

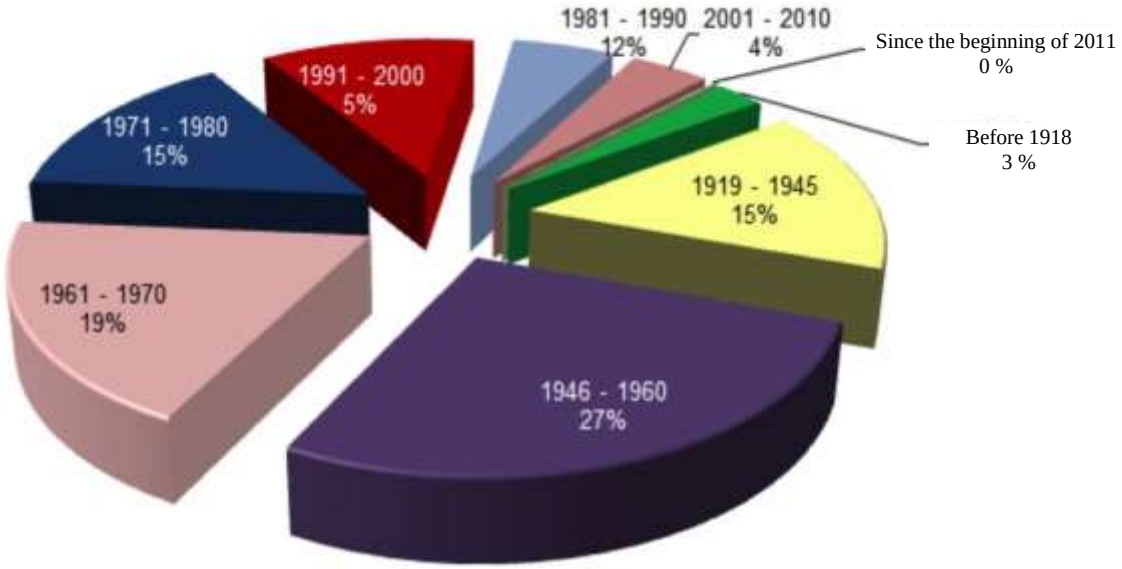


Figure 1.2.2-6: Distribution of residential buildings in Bulgaria by year of construction

Overall condition

The biggest problems with regard to the deterioration of the technical characteristics are seen in multifamily residential buildings made of large prefabricated panels. These problems have exacerbated over the years due to inadequate management, withdrawal of owners from communal life and collective responsibility for the building, limited or zero maintenance of the common areas in the vast majority of cases, partial and patchy improvements on building facades without any quantitative and qualitative assessment of the effect from their realisation, low collection of contributions to the repair and renovation fund, as required by the ZUES, misbehaviour by some occupants, lack of financial means for routine and major repairs, lack of interest in regard to the energy and technical audits required, heterogeneous heating of the residential units, disconnection of heating fixtures in the common areas, low purchasing power, poverty, etc. These are only some of the reasons for the serious decline in the thermal and sanitary comfort of these buildings, leading to a shorter lifecycle and to a need for serious in-depth engineering evaluation.

Many expert assessments and analyses demonstrated that around 10 % of the panel residential buildings need urgent repair of internal installations and roof waterproofing, along with thermal insulation of external walls and replacement of windows and doors.

Analysis by heat-supply system

This indicator is relevant for the energy consumption in buildings, the assessment of the level of heating, ventilation and cooling technologies used, the assessment of the serviceability and efficiency of heat generators and of the systems distributing thermal energy in the residential units, the assessment of the microclimate parameters maintained in the buildings and the level of thermal comfort in the residential units. The indicator has a direct impact on the quality of life in residential units, the energy consumption and energy costs, and also on the assessments made to address energy poverty and the provision of energy cost allowances to the population.

The assessment is based on a general classification provided in Figure 1.2.2-7.

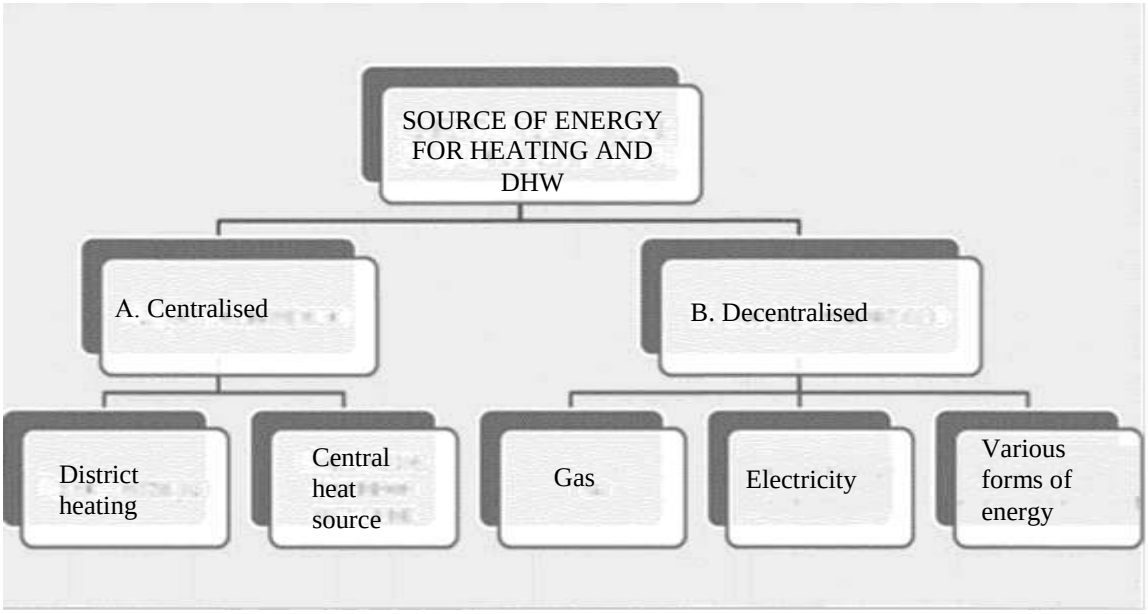


Figure 1.2.2-7 Sample diagram[3] of the classification of buildings by type of heat-supply system

The right to access to energy is universal. On the other hand, energy is also a commodity that is supplied and traded. In this regard, the issues related to energy quality at end-user level and security of the energy supply are of high concern to consumers.

Figure 1.2.2-8 shows the distribution of the heat-supply systems used in residential buildings in Bulgaria.

[3] *Source: Technical University of Sofia*

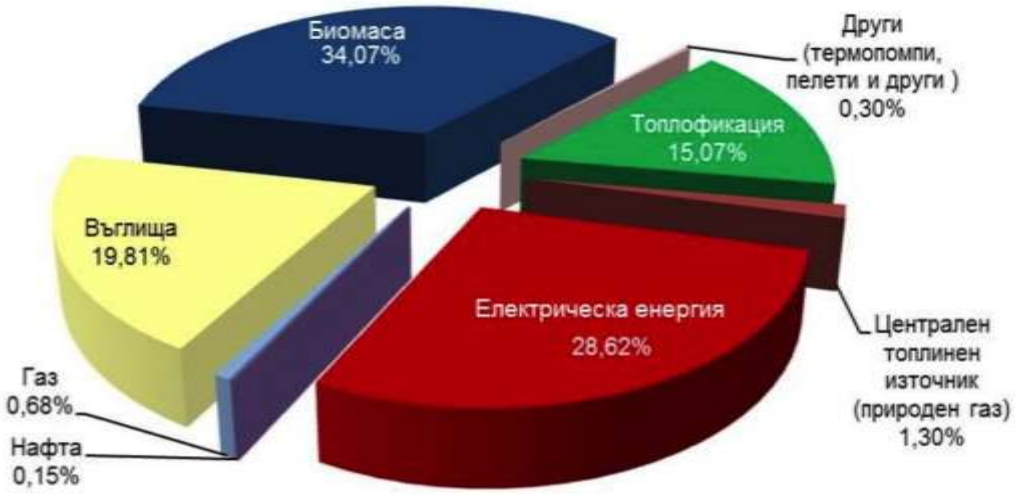


Figure 1.2.2-8 Share of the forms of energy/heat-supply systems used for residential heating in Bulgaria, 2011

Key

Biomass	34.07 %	Heating oil	0.15 %
Electricity	28.62 %	Central heat source (natural gas)	1.30 %
Coal	19.81 %	Gas	0.68 %
District heating	15.07 %	Other (heat pumps, pellets, etc.)	0.30 %

The results of the analysis of statistical data related to the heat supply of 2 666 733 residential units in 2011 showed a major imbalance in the use of fuels and energy for residential heating. There are four main energy sources: biomass, electricity, coal and district heating.

The use of electricity for heating remains relatively high, while the use of natural gas for generating heat by combustion in local or district heat sources is very low. The share of electricity in the final energy consumption of Bulgarian households is the highest in Europe — 39 % against an EU-27 average of 30 %.

Household gasification is making a slow progress. As of 2016, just 2.5% of Bulgarian households in 20 cities were using natural gas for heating and domestic needs. In the scenario for accelerated gasification in Bulgaria, the forecasts for the development of the gas industry provide for a gasification of 30 % of the Bulgarian population by 2020, which will increase the national consumption of natural gas to 6 billion Nm^3 per year. Conversion from electricity to natural gas in households will lead to major savings of primary energy.

District heating remains the most efficient heating option in cities with developed heat transmission networks, despite the many disputes over the distribution, measurement and reporting of thermal energy at the homes of end users. The service is available in 18 Bulgarian cities and just 16 % of Bulgarian citizens receive district heating services, while in different EU Member States this share varies from 23 % to 64 %. Although the substations in the majority of buildings connected to district heating networks have been replaced and fully modernised, the heating systems powered by them are largely obsolete and much heat is lost in the buildings' distribution networks due to the characteristics of these condominiums. The common heating installations in multifamily residential buildings are based on traditional designs. In the majority of buildings they are in poor operational condition, with obsolete elements and pipelines.

A national system has been introduced for individual reporting (heat allocation) of heat in the standalone units in the buildings. It is difficult to operate this system due to the uneven thermal load of heating installations, which is a result of some subscribers having opted out of the service, as well as other fraudulent subscribers who abuse the system by declaring that they have cancelled the service, while continuing to consume heat.

The National energy efficiency action plan 2014–2020 shows that households are the third largest user of energy, with their consumption remaining essentially constant at 2.1–2.2 Mtoe per year. The share of this sector in the final energy consumption has also remained constant at 25–26 %. Energy consumption per residential unit is increasing, with electricity consumption growing at a particularly fast rate. The reasons for this have not been examined thoroughly, although one possible explanation is the increasing use of energy for cooling in summertime.

The risk associated with exacerbated energy poverty has been studied in an in-depth analysis of household spending during a period of 15 years, from 1999 to 2014, using data from the NSI. The data analysis revealed that during the 15-year period the average household spending is BGN 5 854.64 per year, while consumer spending on this basis is 84.5 % or BGN 4 948 per year.

Average spending on housing, water, electricity and fuels for household use was 41 % of the expenses for food and non-alcoholic beverages, nearly three times the annual expenditure on healthcare, nearly four times the expenditure on culture and education, and more than four times the expenditure on clothing and shoes. Spending on transport, communications, taxes, alcoholic beverages and tobacco is similar during the period under consideration.

Figure 1.2.2-9 presents and overview of the average spending of Bulgarian households for the 1999–2014 period.

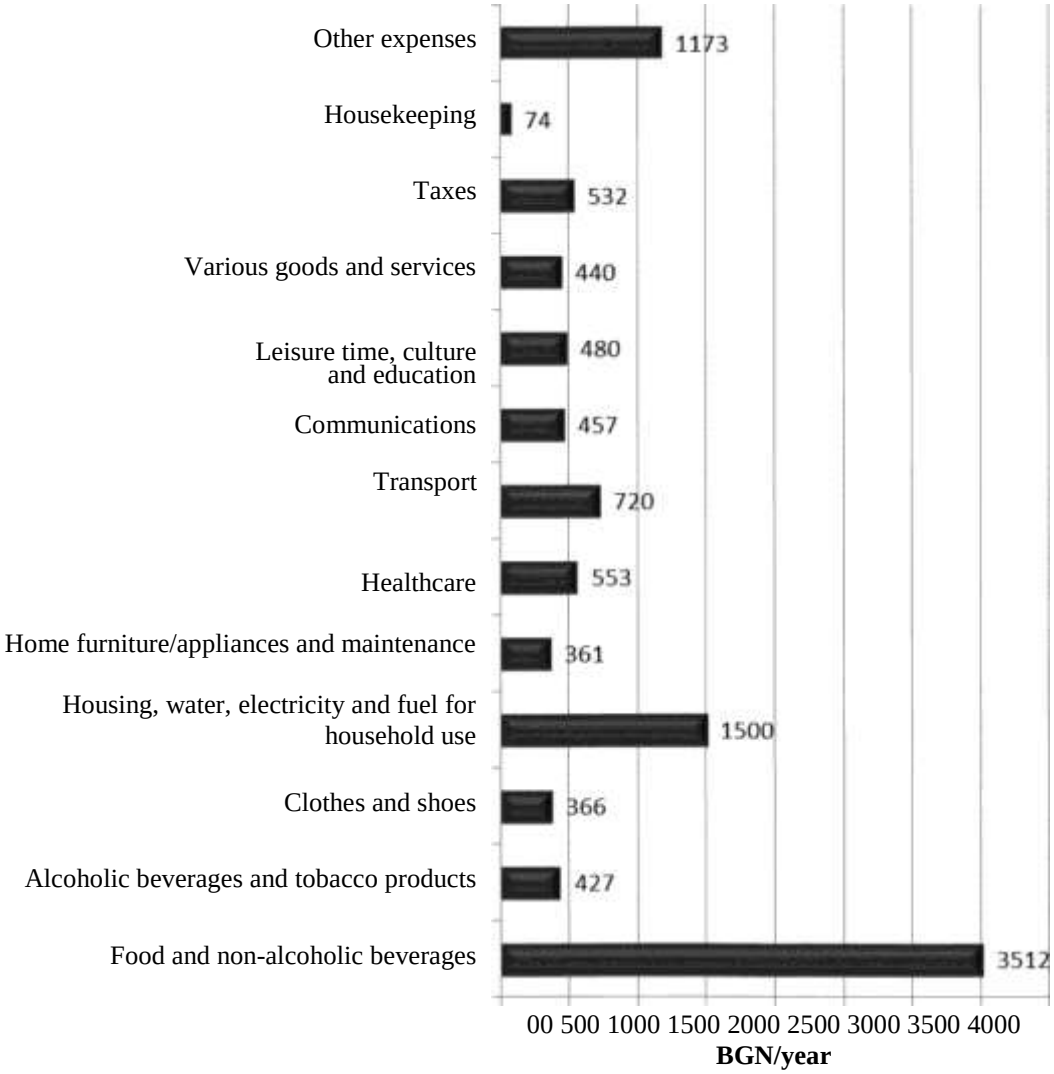


Figure 1.2.2-9 Distribution of average household spending by type of expenses[4], 1999–2014

Based on the above data, the analysis of the Programme should also consider energy prices, regardless of the fact that they are the subject of sectoral analyses and forecasts. An accurate comparison can be made after the energy prices are adjusted to the unit of energy produced by energy sources (BGN/kWh or BGN/MWh), with due account taken of conversion efficiency. The prices of energy supplied to end-users in residential buildings, as shown in Table 1.2.2-2, are taken as a baseline for the purposes of this document:

[4] *The chart excludes loans and other financial borrowing, which aggravates considerably the results shown on an annual basis.*

Table 1.2.2-2: Average prices[5] of energy from main energy sources in Bulgaria (projection to 2030)

Energy source	***Price, BGN/MWh***
Gasoil	180
Natural gas	110
Wooden pellets (with an average calorific value of 4 800 kWh/t)	108
District heating	115
Electricity	210

Efficiency in the household sector is measured by the climate-adjusted annual energy consumption per residential unit, in toe/residential unit. In recent years there has been an increase in this indicator due to the intense use of electricity both for heating in wintertime and for air conditioning in summertime.

The normalised energy consumption of multifamily residential buildings in the coldest climate zones of Bulgaria was calculated to be 331–395 kWh/m^2 while the European average is 180 kWh/m^2. The baseline values with regard to the consumption of primary energy are in the range from 365 to 435 kWh/m^2. The primary energy consumption was calculated for gasoil and natural gas with an adjustment for losses in extraction/production and transmission e_i=1.1.

These numbers point to a major energy savings potential in the household sector. Accordingly, application of energy saving measures in residential buildings will have a major contribution to the achievement of the national energy efficiency target in the light of the fact that Bulgaria uses the 25 % energy savings allowance at FEC level in accordance with Article 7(2) of Directive 2012/27/EC.

1.2.3 Analysis by social welfare indicators

Welfare indicator

This indicator is monitored in regard to the universal right of access to water, energy and sanitation. It includes a number of technical indicators, as well as certain conveniences such as bathrooms or toilets, non-leaking roofs or sufficient light in the residential units, which are complementary to the quality indicators of the residential unit.

Most Bulgarian homes are electrified, except for 0.02 % in inaccessible locations without energy transmission and/or distribution grids. The proportion of residential units not connected to water supply networks is a little higher — 7.6 %. Drinking water consumption by households accounts for 8 to 10 % of the overall water use in Bulgaria.

While 70.2 % of the urban areas do have sewerage systems, wastewater discharge is a major problem in the rest of the cities. In terms of smaller towns and villages, just 2.1 % of all villages have sewerage systems. The overall

[5] *Prices include VAT. Source: Energy strategy of Bulgaria by 2020.*

share of the population which has access to sewerage networks is 46 %.

Water supply systems in Bulgaria are out-dated and obsolete, and generate major losses of water. According to the MRRB, one-third of these systems require major reconstruction or modernisation. The condition of water supply systems has implications on the sanitary properties of drinking water and on sanitation levels in the residential units.

More than 70 % of the inhabited units have indoor bathrooms and toilets. The proportion of homes without any toilet, either indoor or outdoor, is negligibly low (about 1.1 %), and nearly 10 % of the residential units do not have bathroom facilities.

In order to ensure information on energy savings policies, the 2011 Census introduced for the first time systematised data on energy-saving window joinery and thermal insulation of residential units. The data reveal that in 29.0 % of all residential units the original window joinery has been replaced by an energy-saving type and 15.5 % of the units have thermal insulation applied on their external walls and accordingly have envelopes with better energy performance. The data collected are only quantitative and do not provide specific information on the energy saving impact of the measures implemented in residential units. In this regard, databases should be created at a national level on the energy consumption of households and on the thermal comfort maintained in the residential units as a function of heat energy use.

A comparison between the two most recent censuses reveals major developments in the past 10 years as regards the extent to which Bulgarian homes are equipped with domestic appliances and equipment. As of 1 February 2011, 97.9 % of the inhabited homes had a TV set, 93.2 % had an electric cooker and 93.3 % had a refrigerator. Computers were available in 54.1 % of urban dwellings and 18.1 % of rural dwellings, while computer penetration in 2001 was as little as 4 % of all inhabited homes. 51.4 % of inhabited urban dwellings and 16.4 % of inhabited rural dwellings had internet access. While only 6 % of the residential units had a satellite antenna in 2001, this percentage rose to 22 % in 2011.

These data demonstrate that there is an increase in the number of electrical household appliances, with the obvious consequence that households tend to use more electricity.

Access to Housing indicator

A definition of this concept is provided in Regulation 362/2008/EC. *Access* in this context applies to services which are actually used by households to meet financial as well as physical and mental health needs. It relates to objective and physical reality, rather than being based on subjective judgements.

The *access to housing* indicator is a key metric of quality of life and of the functioning of the housing market. In the Green Paper on the development of the single market for postal services, accessibility is understood to relate to the ability of each citizen *to easily pay for the service*.

In addition to being a fundamental need and right of citizens, acceptable housing at affordable prices and in a safe environment is expected to reduce poverty and social exclusion. For Bulgaria, the provision of such housing

remains a major and unsolved challenge that has become more difficult over the years. It has been established that there is a direct link between the general state of the economy and the free housing market in the country.

The 'overcrowding of dwellings' indicator

a) The macroeconomic situation

In its third in-depth review of Bulgaria (SWD (2014) 76 final, 5 March 2014), the European Commission concluded that Bulgaria continues to experience macroeconomic imbalances, stemming in particular from the impact of corporate indebtedness, as well as the continuing adjustment of external positions, competitiveness and the labour market. The recovery in Bulgaria has been slow and the economy continues to operate considerably below potential. After a moderate rebound in 2011, economic growth has remained under 1 % during the 2012-2013 period and is projected to pick up only slowly in 2014-2015 (*EC forecast*, 2014).

Table 1.2.3-1: Key economic, financial and social indicators for Bulgaria[6]

Key economic, financial and social indicators— Bulgaria	2007	2008	2009	2010	2011	2012	2013	2014	2015
Real GDP (yoy)	6.4	6.2	-5.5	0.4	1.8	0.8	0.5	1.5	1.8
Private consumption (yoy)	9.0	3.4	-7.6	0.1	1.5	2.6	-0.3	1.3	1.6
Public consumption (yoy)	0.3	-1.0	-6.5	1.9	1.6	-1.4	3.0	2.2	2.1
Gross fixed capital formation	11.8	21.9	-17.6	-18.3	-6.5	0.8	2.1	2.4	4.2
Exports of goods and service (yoy)	6.1	3.0	-11.2	14.7	12.3	-0.4	4.9	3.4	5.5
Imports of goods and services (yoy)	9.6	4.2	-21.0	2.4	8.8	3.7	4.1	3.7	5.9
Output gap	5.3	6.2	-2.2	-2.4	-0.9	-1.0	-1.7	-1.7	-1.6
Contribution to GDP growth:									
Domestic demand (yoy)	9.4	8.5	-12.0	-4.9	-0.3	1.6	0.7	1.7	2.2
Inventories (yoy)	0.9	-0.7	-3.4	-0.4	0.3	1.9	-0.6	0.0	0.0
Net exports (yoy)	-3.8	-1.5	10.0	5.6	1.8	-2.7	0.3	-0.2	-0.4
Current account balance of PoB (% of GDP)	-25.2	-23.1	-8.9	-1.5	0.1	-1.3	.	.	.
Trade balance (% of GDP), PoB	-19.7	-20.6	-8.2	-2.5	0.4	-2.9	.	.	.
Terms of trade of goods and services (yoy)	-0.1	-0.4	1.5	2.5	0.1	-1.3	2.3	0.0	-0.3
Net international investment position (% of GDP)	-81.1	-98.4	-101.8	-95.4	-85.9	-79.7	.	.	.
Net external debt (% of GDP)	32.7	48.9	49.6	43.6	35.2	28.8	.	.	.
Gross external debt (% of GDP)	94.3	105.1	108.3	102.7	94.3	94.9	.	.	.
Export performance vs. advanced countries (% change over 5 years)	58.4	49.6	28.9	25.1	25.9	15.8	.	.	.
Export market share, goods and services (%)	0.1	0.2	0.1	0.1	0.2	0.2	.	.	.
Savings rate of households (net saving as percentage of disposable income)	-34.5	-22.6	-4.4	-5.1	.	.	.	.	.
Private credit flow (consolidated, % of GDP)	43.4	34.7	5.1	3.3	1.7	2.5	.	.	.
Private sector debt (consolidated, % of GDP)	130.1	137.9	143.0	140.5	133.4	131.8	.	.	.
							.	.	.
Deflated house price index (yoy)			-20.4	-10.2	-5.5	-1.9	.	.	.
							.	.	.
Residential investment (% of GDP)	5.3	6.1	5.3	2.8	2.4	.	.	.	.
Total Financial Sector Liabilities, non-consolidated (% of GDP)	29.3	-0.8	1.3	-1.7	4.9	10.1	.	.	.
Tier 1 capital ratio (1)	11.6	13.0	17.5	16.5	14.9	14.6	.	.	.
Overall solvency ratio (2)	13.9	14.9	17.0	17.4	17.6	16.6	.	.	.
Gross total non-performing debt (% of total debt instruments and total loans and advances) (2)	3.3	4.8	11.5	17.9	19.7	19.8	.	.	.
Employment, persons (yoy)	3.2	2.6	-2.6	-4.7	-3.4	-4.3	-1.0	0.2	0.5
Unemployment rate	6.9	5.6	6.8	10.3	11.3	12.3	12.9	12.4	11.7
Long-term unemployment rate (% of active population)	4.1	2.9	3.0	4.8	6.3	6.8	.	.	.
Youth unemployment rate (% of active population in the same age group)	14.1	11.9	15.1	21.8	25.0	28.1	.	.	.
Share of labour force (15–64 years)	66.3	67.8	67.2	66.5	65.9	67.1	.	.	.
Young people not in employment, education or training (% of total population)	19.1	17.4	19.5	21.8	21.8	21.5	.	.	.
People at-risk of poverty or social exclusion (% of total population)	60.7	44.8	46.2	49.2	49.1	49.3	.	.	.
At-risk of poverty (% of total population)	22.0	21.4	21.8	20.7	22.2	21.2	.	.	.
Severe material deprivation (% of total population)	57.6	41.2	41.9	45.7	43.6	44.1	.	.	.
People living in households with very low work intensity (% of total population)	15.9	8.1	6.9	7.9	11.0	12.4	.	.	.
GDP deflator (yoy)	9.2	8.4	4.3	2.8	4.9	2.2	2.9	1.9	2.2
Harmonised index of consumer prices (yoy)	7.6	12.0	2.5	3.0	3.4	2.4	0.5	1.4	2.1

[6] *Source: SWD (2014) 76 final, 5 March 2014*

Compensation of employees (yoy)									
Labour productivity (real, per employee, yoy)	3.2	3.7	-3.8	4.4	4.1	3.4	0.7	0.8	2.6
Unit labour costs (whole economy, yoy)	9.3	12.6	12.4	5.2	2.5	-0.5	2.0	2.3	2.1
Real unit labour costs (yoy)	0.1	3.8	7.7	2.4	-2.2	-2.6	-0.9	0.4	-0.1
Real effective exchange rate (ULC, yoy)	7.1	9.0	10.2	3.2	4.0	-4.2	2.5	1.9	.
Real effective exchange rate (HICP, yoy)	4.7	8.6	4.0	-2.9	1.0	-2.0	0.0	0.4	.
Government balance (% of GDP)	1.2	1.7	-4.3	-3.1	-2.0	-0.8	-2.0	-2.0	-1.8
Structural budget balance (% of GDP)	-0.5	-0.3	-3.6	-2.2	-1.7	-0.4	-1.5	-1.5	-1.3
Consolidated government debt (% of GDP)	17.2	13.7	14.6	16.2	16.3	18.5	19.4	22.6	24.1

(1) domestic banking groups and stand-alone banks

(2) domestic banking groups and stand-alone banks, foreign (EU and non-EU) controlled subsidiaries and foreign controlled branches.

Source: Eurostat, ECB, AMECO.

b) Demographics

The demographic and social statistics in Bulgaria is watched closely by the NSI and Eurostat due to the alarming trends and messages. Eurostat predicts that in 2010–2060 Bulgaria will lose almost 27 % of its population and the share of people older than 65 years will reach and exceed 32.6 %. Children under 15 will be as little as 13 % of the Bulgarian population. According to the forecast of the World Bank for the 2012-2050 period, Bulgaria will have the most rapidly decreasing active population in the world. The most disconcerting expectations indicate that in the same period Bulgaria will lose 41 % of the population aged 15 to 24. These heavily pessimistic forecasts will affect directly the characteristics and structure of the educational sector, labour market, quality of workforce, as well as Bulgaria's economy.

The demographic grid clearly indicates that there is a major and long-lasting imbalance in population density on the territory of Bulgaria. The territorial distribution of the population by regions, provinces and municipalities in the country is also uneven. Against this backdrop, the free market for housing is affected, both demand-wise and supply-wise, by domestic migration and the related socioeconomic development/decline of the regions, employment opportunities in the regions, living conditions and opportunities for social inclusion.

c) Free domestic market for housing

A review of market information and expert analyses related to the situation with the housing market and housing loans in Bulgaria was undertaken in order to outline future priorities and policies in the residential sector.

Under the financial crisis, property sales in Bulgaria took a downward course which began in 2009 and continued for five years. This period hardly saw any sales of residential property at the early stages of construction; some interest in this type of deals was observed again in 2013. While the housing market began an uneasy rebound in 2013, its main feature remains 'supply prevails over demand'. Real estate agencies reported that in early 2014 housing prices were at 10-year lows, and financial institutions were already offering better terms for the provision of new mortgage loans or for the restructuring of existing ones.

As the economic situation has begun to improve, economic uncertainty has eased off. Home buyers are

increasingly looking for the best price/quality ratio, which indicates that consumer demand is somewhat on the move. Against this minor improvement, however, housing affordability remains unfeasible as more people are unable to buy a home using own funds and not having to resort to a bank loan.

In 2014, the prices of newly-built residential units ranged from EUR 800 to EUR 1 200 per square metre without VAT depending on quality of execution, location of the property and extent of fit-out works to be completed. The housing market is best developed in Sofia, Varna, Burgas and Plovdiv, while in other regions in the country the market is stagnant.

Unlike housing prices, average rent prices have remained stable within the range from EUR 3.5 to EUR 6.5 per square meter without VAT per month. The rental market is steady with minor ups and downs along the demand curve. Sofia remains the primary destination of rental demand.

In the present market situation, money-backed demand covers as little as 8–10 % of Bulgarian citizens' want for own homes, and maximum 10 % of the demand for privately rented homes. Choices are very limited. The classic indicators which measure housing affordability in Bulgaria are way above, or much worse, compared to other EU Member States. For example, while in 2002 an average household needed 6.1 annual incomes in order to buy a 75 m^2 residential unit, in 2013 a home of 73 m^2 would cost 10.43 annual incomes (figure 1.2.3-1). In Sofia, it takes a lot more annual incomes to buy similar housing space. In the EU Member States this indicator ranges from 2.5 to 4.

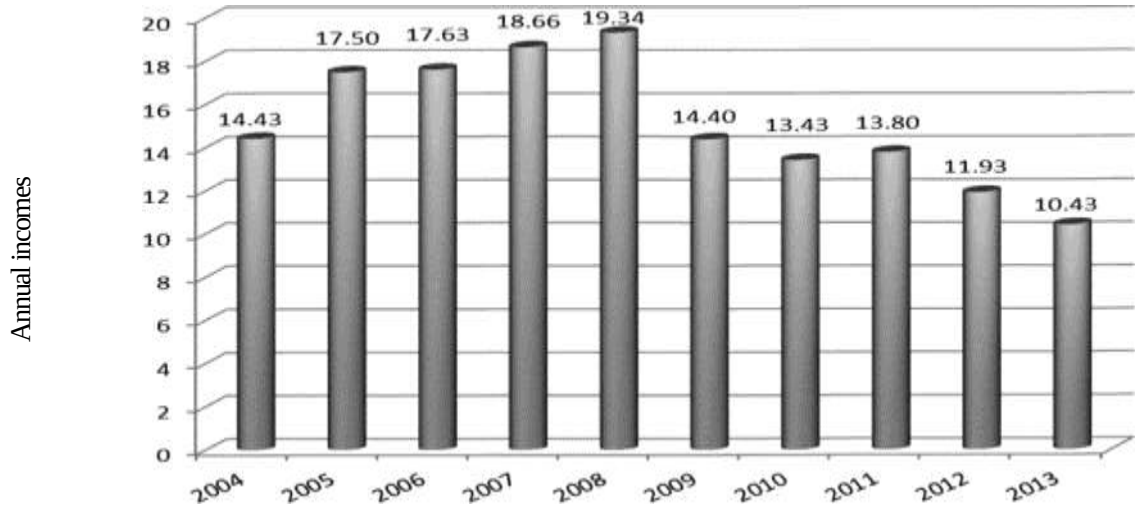


Figure 1.2.3-1: Average annual incomes[7] required to buy a residential unit of 73 m^2

Affordability of rents in the private sector does not look better. An average-income household in a medium city would spend half of their income on renting a two-room apartment, while housing allowances in the balanced economies keep this indicator below 30 %.

Figure 1.2.3-2 displays average market prices of homes other than new construction.

[7] *The estimate does not apply to new construction, but only to transactions with existing properties.*

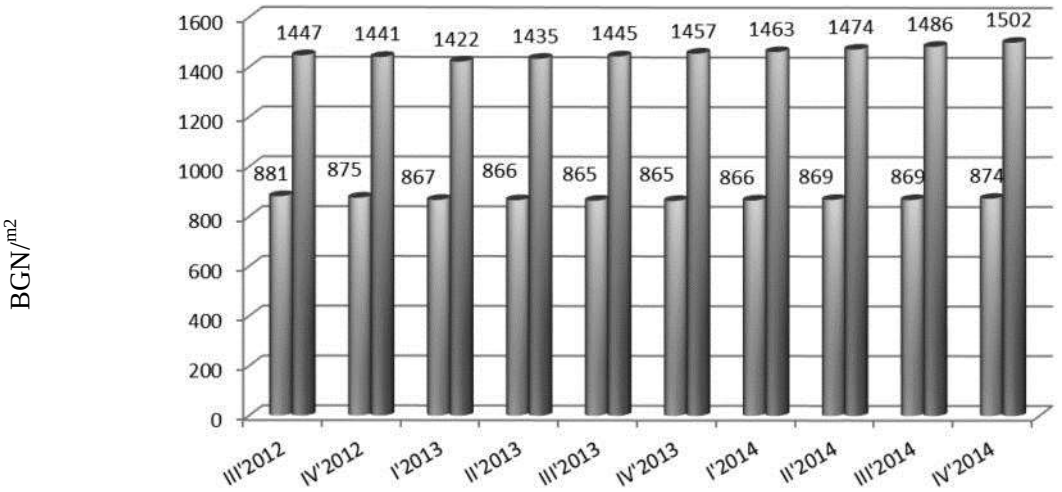


Figure 1.2.3-2: Housing market prices[8] by quarter, country average (lower bars) and Sofia average (tall bars), 2012–2014

The market nature of the housing offering service and the evolving competitive environment have led to the emergence of new forms of offerings to customers in recent years: complex services, such as letting of fully furnished homes, maintenance and repair of individual units or entire buildings, as well as cost management. This service has been steadily present on the Bulgarian market for a several years already. This is a new model, which reflects new market trends in the building management area and fits well to the more demanding requirements and preferences of wealthier consumers. Provision of this complex service is not regulated in Bulgarian housing legislation and is exclusively market-based at present.

A market survey of facility services among providers which have published the prices of their building management packages established that as of 31 December 2013 the average price was around BGN 1.51 per square meter of GFA depending on the package selected by the client. This price does not include the 'salaried house manager' service provided in some condominium buildings.

d) Commercial banks

The information in this part of the report is based on Sectoral Analysis of the Competitive Environment in the Retail Banking Sector, a paper drafted by the Commission for Protection of Competition. The analysis is based on Article 7(1)(5) of the Competition Protection Act and aims to present an overview of the retail banking market from two perspectives: (i) the extent of competition and transparency in the market and the environment in which it operates, and (ii) whether it ensures sufficient benefits to consumers. The analysis was prepared in response to a strong socioeconomic and public interest, which in turn stems from the role of retail banking in the household sector, especially as regards the provision of bank accounts and loans.

It was established that all banks based in Bulgaria operate in the retail banking market. Even the largest actors do not have market shares amounting to a dominant position under the Competition Protection Act. The analysis indicated that 'the factors which influence the offering of housing loans are very similar to those driving the

[8] *Source: NSI*

offering of consumer loans. The main differences are related to the banks' policies of entry and investment in the real estate sector, the better collateralisation and the lower interest rates for residential mortgage loans. Residential mortgage loans are intended for the purchase of properties and are secured by a legally binding mortgage on the property to be purchased or on another property of the applicant (known as 'contractual mortgage'). These loans typically support the purchase of an existing property/building or part of a building, or of a residential unit under construction, as well as the construction of individual houses or for the purchase of land. In terms of demand, the most-sought loans are those for the purchase of existing properties (typically apartments) in large cities. These loans prevail in credit portfolios and come with the longest repayment periods, between 20 and 35 years. About 72 % or more of the residential mortgage loans in Bulgaria are provided to people in working age and in employment. The average customer borrows from EUR 30 000 to EUR 50 000 and has a monthly income of BGN 500–BGN 1 000. Borrowers increasingly ask for longer-term mortgage loans with a view to reducing their monthly instalments'.

The above information foretells that a controversial reality may be unfolding. In the long term, households with mortgage loans will spend increasing proportions of their income towards debt service, which will have a significant and long-lasting impact on family budgets. This creates a plausible risk of poverty after getting the loan from the bank, in particular where one or more family members are affected by unemployment. On the one hand, the longer repayment period defers the liability in instalments which the borrower can afford, and on the other — it flags the unaffordability of the mortgaged home, i.e. borrowers fall in the group of *vulnerable consumers* as soon as they receive their loans. This risk factor is understudied, adequate legislation is lacking and many people lose their homes because of intermediate debt service difficulties or inability to pay the full price.

According to a forecast of credit consultants, during the 2014–2016 period activity in the various segments of the credit market has increased by as much as 8 % and mortgage interest rates are on a gradual downward course. Families with young children form the largest group of borrowers — about 47 % of all borrowers.

Eurostat ranks Bulgaria among the Member States with the highest poverty rates, together with Latvia (21.3 %), Romania (21.1 %), Greece (20.1 %), Lithuania (20.2 %) and Spain (20.7 %). In the last seven years earnings of the wealthiest people in the country have been 5.9 times the earnings of the poorest.

Overcrowding is a key indicator for the assessment of the quality of living conditions and the poverty risk. This indicator reflects the proportion of people living in overcrowded homes, which is determined by the number of rooms available to the household, the size of the household, and the age/family status of household members. Figure 1.2.3-3 presents the results of a Eurostat analysis of the quality of living conditions and the positioning of Bulgaria in regard to the other EU Member States.

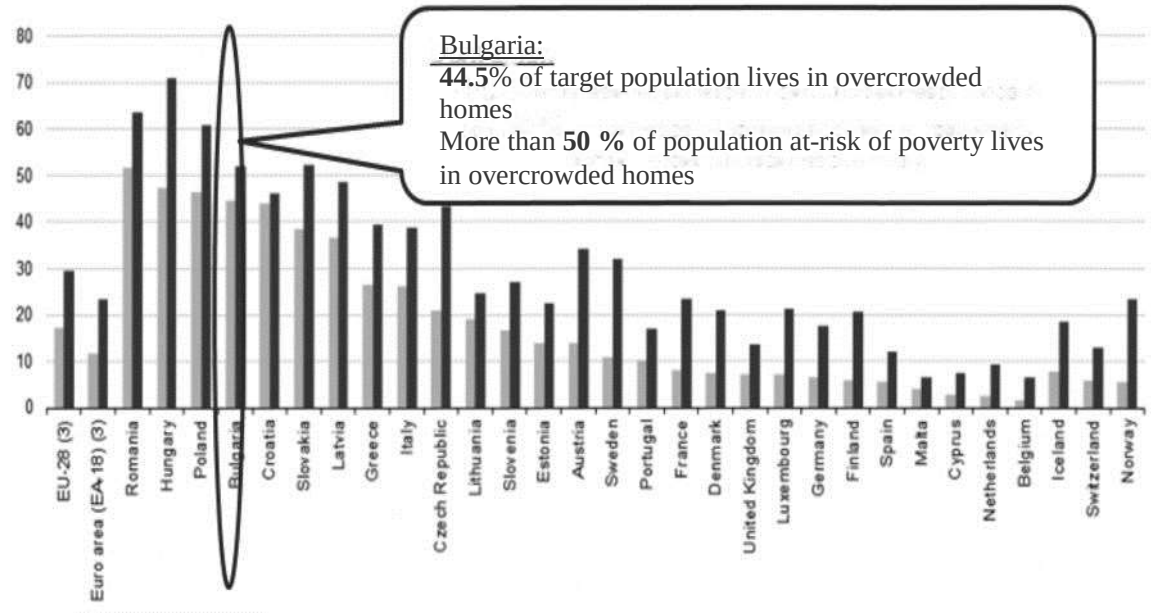


Figure 1.2.3-2: Quality of living conditions[9] in Bulgaria and in the EU

As seen from the chart, Bulgaria ranks among the worst-performing countries both by overcrowding and at-risk of poverty, together with Romania (51.6 %), Hungary (47.2 %), Poland (46.3 %) and Croatia (44.1 %).

The estimated useful area per capita per dwelling as of December 2013 was 39.53 m^2. The country-average useful area per dwelling for the same period was 73.10 m^2, with less than half of it being living area (30.01 m^2) or 40.58 % of the useful residential area (the rest being service area).

[9] *Source: Eurostat*

Housing sufficiency

Housing sufficiency is a quantitative indicator which measures the available building stock in regard to the housing requirements at a macro level. It is expressed in *number of dwellings per 1 000 occupants*. Unless combined with other parameters, its informative capacity is limited as it does not depict the qualitative characteristics of the counted dwellings. Against the demographic backdrop of Bulgaria, a country-average value may be misleading. The analysis revealed that for the indicator to be calculated correctly, the NSI data should be processed by a specific method, which requires differentiation that is different from the one of publicly available data. It would be appropriate to measure this indicator with regard to the number of permanently inhabited dwellings, i.e. those used for permanent living, rather than in respect of the total number of dwellings (inhabited + uninhabited). The indicator should also be adjusted to the demographic profile of the respective region or locality for which assessments and forecasts are developed. Furthermore, the concept of *uninhabited dwellings* should be refined and adequately adapted for the purposes of the national provisions.

Example: Pursuant to Directive 2010/31/EU, residential buildings used for their intended purpose for less than four months in a year are excluded from the national energy efficiency requirements; however, this derogation does not treat the buildings concerned as *uninhabited*. In Bulgaria, these typically include private villas, summer or winter vacation homes, seasonal buildings, etc. Generally, these buildings should not be counted as uninhabited; however, their seasonal use means they should not be included in the base count used for calculating the *number of dwellings per 1 000 occupants* indicator, because their inclusion improperly elevates the baseline and the results are far from the reality.

If this specificity is considered and only inhabited dwellings are included in the base count, the value of the indicator would be more realistic: 362 dwellings per 1 000 occupants, which is below the European average of 420/1 000. If the example above is taken into account, this value can be interpreted as shortage of homes in the country, i.e. as a case of housing insufficiency.

According to the updated version of the National Demographic Strategy of Bulgaria 2012–2030, the average number of occupants per dwelling is 2.1 in urban areas and 1.5 in rural areas. The most densely occupied homes are found in the provinces of Blagoevgrad (2.3 occupants), Plovdiv, Pazardzhik and Sliven (2.1). An average dwelling in Sofia is occupied by 2.0 persons. The provinces with the most sparsely occupied homes are Pernik (1.4 occupants), and the provinces of Burgas, Vidin, Gabrovo and Montana (1.5 occupants per dwelling).

1.3 The energy profile of buildings in Bulgaria

For the purpose of determining energy performance, the building is regarded as an integrated system and its energy consumption is a function of the combined effect of the following main components:

- ✓ envelope components of the building;
- ✓ systems ensuring microclimate parameters;
- ✓ internal heat sources;
- ✓ occupants;
- ✓ climatic conditions.

Figure 1.3-1 provides a graphic illustration of the concept used for determining the energy performance of buildings.

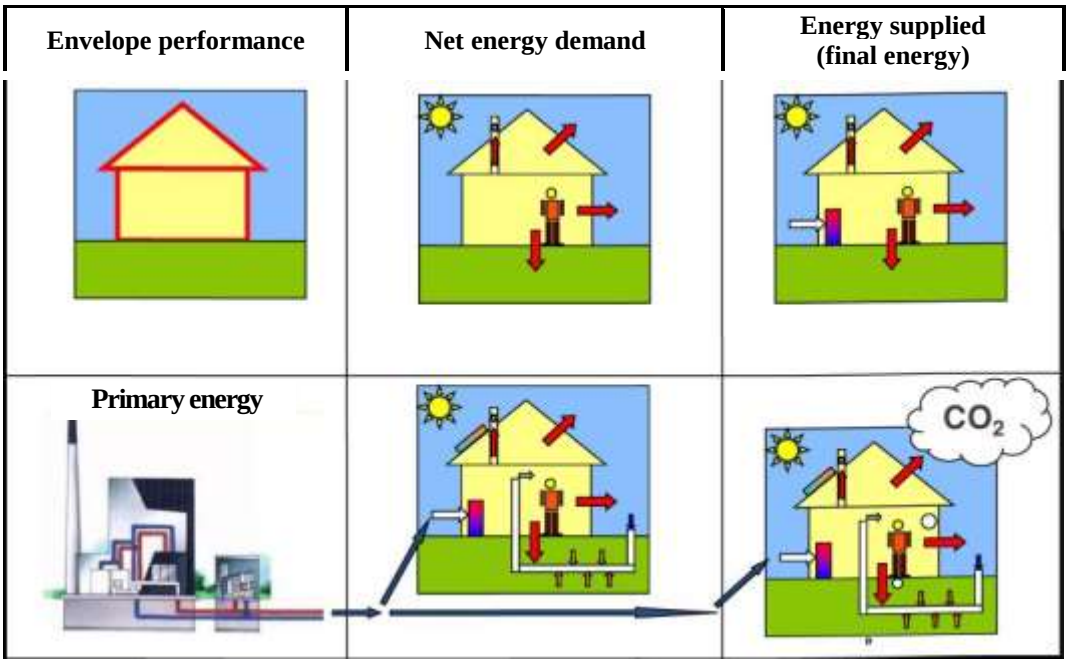


Figure 1.3-1: Determining[10] the energy performance of buildings

Energy profiling of buildings in Bulgaria is based on a selected key indicators for energy consumption:

Group 1: Indicators which characterise the energy-conversion and energy-transmission properties of building envelopes and microclimate systems:

- Heat transmission coefficient, external walls (U, W/m^{2}K);
- Heat transmission coefficient, windows (U, W/m^{2}K);
- Efficiency rating of the generator of heating and/or cooling energy (%);

[10] *Source: Technical University of Sofia*

Group 3: Indicators which characterise the energy consumption of the building as a whole:

- Total annual specific consumption of energy for heating, cooling, ventilation, DHW, lighting and appliances, an integrated indicator measured in kWh/m^2.

1.3.1 Energy profile by heat transmission coefficient (external walls and windows, U, W/m^{2}K)

This assessment analyses the combined impact of the energy indicator U-value, W/m^{2}K and the *year of commissioning* indicator, assessed in item 1.2 above. A review of the construction and technical standards for the period 1959–2015 was carried out. Analysis of the results revealed that most of the buildings in Bulgaria were commissioned between 1959 and 1977, i.e. they have been in use for more than 40 years.

Table 1.3.1-1 Percentage distribution of buildings by functional use and period of commissioning

	Period of commissioning							
Functional use of the building	Before 1959	1959–1977	1977–1980	1980–1987	1987–1999	1999–2005	2005–2010	After 2010
Administrative	21.3 %	33.4 %	7.8 %	15.3 %	12.5 %	4.9 %	2.9 %	1.9 %
Hospital (inpatient and outpatient care)	26.6 %	21.1 %	9.1 %	18.4 %	15.2 %	3.5 %	1.6 %	4.5 %
Kindergarten or nursery	6.8 %	46.2 %	14.8 %	20.7 %	9.0 %	0.2 %	1.3 %	1.1 %
Social home (for children or elderly people)	15.0 %	39.2 %	5.1 %	11.0 %	6.1 %	11.3 %	7.8 %	4.5 %
Building related to culture and art	25.0 %	24.9 %	9.8 %	27.8 %	7.8 %	3.3 %	0.4 %	1.0 %
Boarding house	6.9 %	46.0 %	7.2 %	18.0 %	19.0 %	2.1 %	0.8 %	0.0 %
School	27.1 %	46.2 %	5.5 %	13.3 %	7.1 %	0.4 %	0.4 %	0.0 %
Community centre	22.5 %	61.3 %	7.0 %	7.0 %	1.6 %	0.2 %	0.4 %	0.0 %
Outpatient clinic	21.3 %	28.9 %	8.4 %	24.5 %	14.4 %	0.9 %	0.0 %	1.6 %
University/college	15.7 %	33.3 %	13.6 %	14.0 %	16.4 %	1.7 %	1.4 %	3.9 %
Sport building	2.3 %	31.7 %	8.8 %	32.1 %	18.2 %	1.0 %	4.3 %	1.7 %
Building related to commerce or hospitality (recreation centre)	9.6 %	35.7 %	23.6 %	21.5 %	3.7 %	0.0 %	4.5 %	1.4 %
Building related to transport	0.0 %	33.9 %	0.0 %	8.1 %	45.8 %	0.0 %	0.0 %	12.2 %
Residential buildings	42.0 %	19.0 %	15.0 %	12.0 %	5.0 %	4.0 %	0.01 %	3.0 %

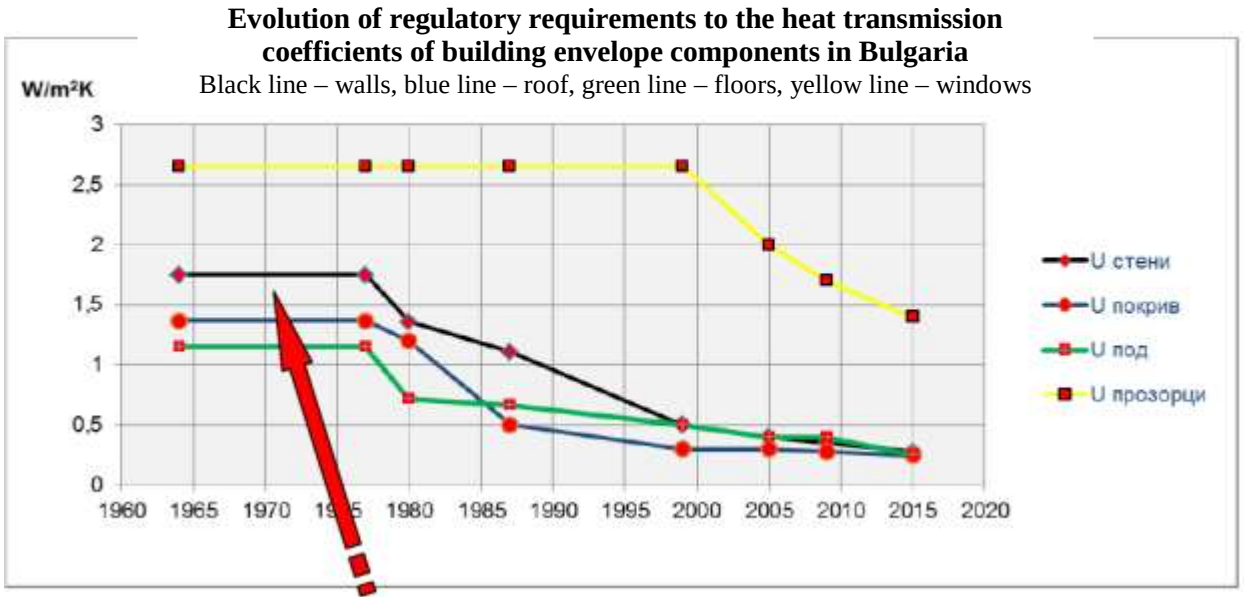


Figure 1.3.1-1: Regulatory requirements to the heat transmission coefficients of building envelopes in Bulgaria

Considerable part of the buildings was commissioned during the 1959–1977 period, in accordance with the regulations in force at that time, and ten years later, by 1987, the heat transmission coefficients of their walls and windows were 1.75–1.11 W/m^{2}K and respectively 2.65 W/m^{2}K. Due to the long-term use of these buildings and the increasing infiltration through joinery, the heat transmission coefficient of the walls and windows of non-ESM buildings can reach an aggregated value of up to 3.5 W/m^{2}K, thus heat losses through walls and windows reach 70 %–85 % of the total heat loss through building envelopes, followed by heat losses through roof structures. This shows that priority should be given to measures to improve the energy performance of envelopes, especially in the buildings in which energy efficiency measures have not been applied at all.

Table 1.3.1-2: Energy profile of the buildings based on the heat transmission coefficients of their walls and windows (U, W/m^{2}K)

Envelope component	***Standards applicable in 1959–1987***	***Standard applicable as of 2015***	***Deviation, %***
Walls	1.75÷1.11	0.28	80 %
Windows	2.65	1.4÷1.7	42 %

1.3.2 Energy profile by the efficiency rating of heating/cooling energy generators, η (%)

This assessment analyses the combined impact of the energy indicators *efficiency rating of the generator of heating and/or cooling energy* (η, %) and *type of heating/cooling system*, assessed in item 1.2 above.

The results from energy audits carried out in various climate zones of Bulgaria and in buildings using various heat supply sources were subject to an expert analysis. Comparability was ensured by taking into account buildings the heat sources of which are identical with the ones used for the assessment by *type of heating/cooling system*.

Table 1.3.2-1: Energy profile of the buildings based on the efficiency ratings of heating/cooling energy generators, %

Energy source	***Efficiency rating of heat generators with the existing condition of the buildings***	***Minimum rating required by standards currently in force[11]***	***Deviation, %***
Gasoil	65÷80 %	87.8 % for standard boilers 90.4 % for low-temperature boilers	18 %
Coal	55÷65 %	87.8 % for standard boilers	32 %
Biomass	45÷55 %	82 % for natural-draught boilers	39 %
Natural gas	80÷87 %	93 % for condensation boilers 96 % for upgraded condensation boilers	12 %

1.3.3 Energy profile by the integrated indicator Total annual specific consumption of energy for heating, cooling, ventilation, DHW, lighting and appliances (kWh/m^2)

The energy consumption of a building is calculated on the basis of its one-month energy balance, wherein the building is treated as an integrated system. This approach requires the use of non-fixed and fixed components of energy flows across the entire tract, from heat exchange in the heated/cooled space to the transmission/distribution system and finally to the energy generator/converter. Regulation No 7 of 2004 on the energy efficiency of buildings sets out a scale of energy consumption classes of 10 building categories. The scale is developed in accordance with BDS EN 15217 and with the requirements laid down in the methodological framework provided by Commission Delegated Regulation (EU) No 244/2012 of 2012 supplementing Directive 2010/31/EU on the energy performance of buildings by establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements (OJ L 81/18 of 21 March 2012).

[11] *The technical requirements stated in the table are not exhaustive. All technical requirements are set out in Regulation No 7/2004 on the energy performance of buildings*

Specific consumption of energy for heating, cooling, ventilation, DHW, lighting and appliances (kWh/m^2) is the key indicator for assessing the energy efficiency level of a building. It provides the most holistic energy profile of the energy consumption in the building.

Table 1.3.3-1 presents the energy profile by *Specific consumption of energy for heating, cooling, ventilation, DHW, lighting and appliances* (kWh/m^2).

Table 1.3.3-1: Energy profile of buildings[12] by Specific consumption of energy for heating, cooling, ventilation, DHW, lighting and appliances (kWh/m^2)

EXPECTED ENERGY SAVINGS AFTER RENOVATION/NEW CONSTRUCTION BY BUILDING CATEGORY (per energy-consumption class)	Savings following renovation **from class F to class B**		Savings following renovation **from class E to class B**		**NZEB** savings compared to class B
	Primary energy	Final energy	Primary energy	Final energy	Primary energy
	kWh/m^2	kWh/m^2	kWh/m^2	kWh/m^2	kWh/m^2
Administrative buildings	340.00	170.85	240.00	120.60	105.50
Healthcare buildings	409.00	205.53	296.50	148.99	105.50
Buildings related to culture and art	275.00	138.19	195.00	97.99	83.00
Kindergartens	260.00	130.65	195.00	97.99	49.00
Hotels	350.00	175.88	240.00	120.60	128.00
Residential buildings	256.50	128.89	184.00	92.46	71.50
Sport buildings	356.50	179.15	244.00	122.61	131.50
Commercial buildings	481.50	241.96	319.00	160.30	206.50
Schools	145.00	72.86	105.00	52.76	38.00
Universities	222.50	111.81	157.50	79.15	68.00
State-owned buildings	286.86	144.15	204.71	102.87	82.93

[12] *Source: Technical University of Sofia*

2. DEFINING ECONOMICALLY EFFICIENT APPROACHES FOR IMPROVING THE ENERGY PERFORMANCE OF BUILDINGS

The Programme sets out economically efficient scenarios for improving the energy performance of buildings. The assessment is based on a quantitative assessment of energy, environmental and financial indicators reflecting costs and benefits, which was obtained by a modelling survey followed by an economic analysis (in accordance with the methodological framework set out in Delegated Regulation No 244/2012/EU) of the following reference buildings:

- single-family buildings;
- multifamily buildings;
- administrative buildings;
- healthcare buildings;
- schools;
- kindergartens;
- universities;
- culture and art building;
- sport buildings;
- hotels;
- commercial buildings,

under the following conditions:

- ✓ basic heat supply scenario: district heating, gasoil;
- ✓ climatic factors: Zone 7 (continental climate) and zone 1 (marine climate);
- ✓ real interest rate: 3 %, 4.5 % and 6 %;
- ✓ energy price escalation: 1 % p.a., 2 % p.a;
- ✓ product price escalation: 0.5 % p.a.;

Packages of energy-saving measures in combinations tailored to each building were assessed for each scenario in accordance with the requirements laid down in Directive 2010/31/EU. Table 2-1 shows the key parameters of the individual energy-saving measures on which the scenarios are based.

Table 2-1 Parameters of the individual energy-saving measures (ESM)

No	Ref.	Level	ESM	Parameter	Value
1	B1.1	1	Replacement of windows and doors	U_{win}	1.4
	B1.2	2	Replacement of windows and doors	U_{win}	1.1
	B1.3	3	Replacement of windows and doors	U_{win}	0.9
2	B2.1	1	Thermal insulation of walls	U_w	0.25
	B2.2	2	Thermal insulation of walls	U_w	0 22
	B2.3	3	Thermal insulation of walls	U_w	0.15
3	B3.1	1	Thermal insulation of roof	U_r	0.28
	B3.2	2	Thermal insulation of roof	U_r	0.22
	B3.3	3	Thermal insulation of roof	U_r	0.15
4	C1	C1	Central heating (substation)		
5	C2	C2	Installation of biomass-fired boiler (pellet plant)		
6	C3.1	1	Installation of gas-fired boiler	η	0.93
	C3.2	2	Installation of gas-fired boiler	η	1.03
7	C4	C5	Installation of boiler fired by liquid fuel		
8	C5.1	1	Installation of direct evaporation heat pump	COP/EER	4/3.5
	C5.2	2	Installation of direct evaporation heat pump	COP/EER	5/4
	C5.3	3	Installation of direct evaporation heat pump	COP/EER	5.5/5
9	C6	C6	Installation of water-water heat pump		
10	C7	C7	Installation of ground-water heat pump		
11	C8	C8	Central heating		
12	C9.1	1	Installation of air-air heat pump	COP/EER	3.5/3
	C9.2	2	Installation of air-air heat pump	COP/EER	4/3.5
	C9.3	3	Installation of air-air heat pump	COP/EER	4.5/4
13	C10	C10	Installation of water-air heat pump		
14	C11	C11	Installation of ground-air heat pump		
15	C12	C12	Heat recuperation		
16	C13	C13	Central heating		
17	C14	C14	Installation of biomass-fired boiler (pellet plant)		
18	C15	C15	Installation of gas-fired boiler		
19	C16	C16	Installation of ground-water heat pump		
20	C17	C17	Installation of a system to utilise solar heat		
21	C18.1	1	Air-water air cooler	EER	3.5
	C18.2	2	Air-water air cooler	EER	4
	C18.3	3	Air-water air cooler	EER	5
22	C19	1	Installation of water-water heat pump		
23	C20	1	Installation of direct-evaporation heat pump		
24	C21	1	Energy efficient lighting		

The economic analysis of the scenarios was made using the indicator '*present value of the global costs'* over a calculation period of 30 years, with an assessment of sensitivity to real interest rate, escalation of product prices and escalation of energy prices.

The simulation and subsequent economic analysis of the global costs led to the identification of the range of the investments (without VAT) necessary for the implementation of energy saving measures designed to achieve Class B requirements, as well as their environmental performance, namely:

- Investments required to achieve Class B requirements: BGN 100–200/m^2 GFA;
- CO_2 emission savings following the renovation of a building against the 1999 baseline: 11–19 kg CO_2/m^2 GFA.

2.1 Buildings owned by the State and municipalities

According to the information maintained in the AUER database, as of 1 January 2016 there were 5 660 non-renovated State and municipal buildings with a combined GFA of 9 162 308 m^2. Six potential scenarios for the renovation of these buildings were analysed and developed on the basis of two assumptions regarding the basis on which renovation can be realised:

- Fixed basis renovation – different proportions (5 %, 10 % or 7 %) of all non-renovated GFA as of 1 January 2016 (9 162 308 m^2) is renovated, regardless of how much non-renovated GFA remains each year: Scenarios A2, B2 and C2;
- Floating basis renovation — different proportions (5 %, 10 % or 7 %) of the non-renovated GFA remaining as of 1 January of the next year are renovated: Scenarios A1, B1 and C1.

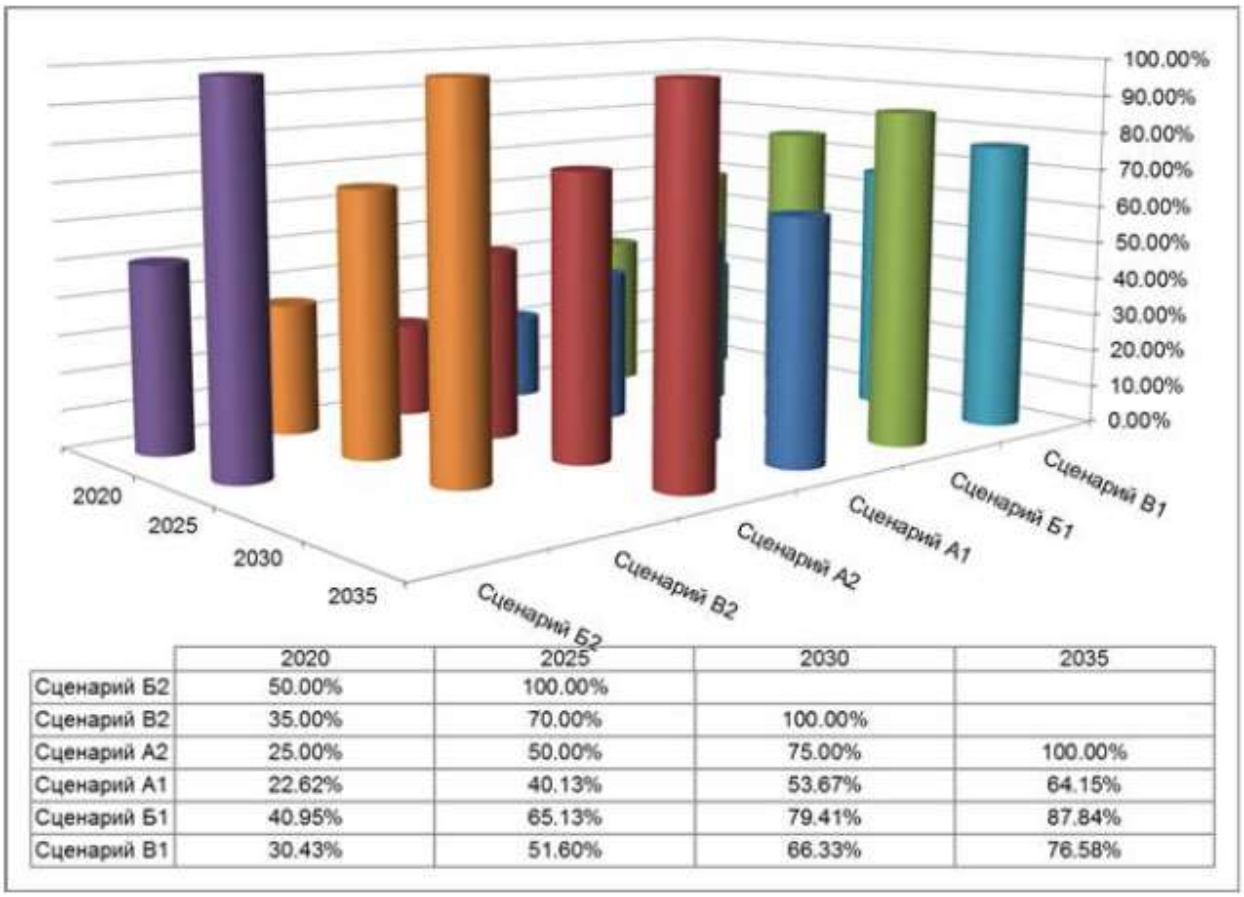
- ✓ SCENARIO A1: Renovation of 5 % of the non-renovated GFA remaining as of 1 January of the next year;
- ✓ SCENARIO A2: Renovation of 5 % of the non-renovated GFA as of 1 January 2016;
- ✓ SCENARIO B1: Renovation of 10 % of the non-renovated GFA remaining as of 1 January of the next year;
- ✓ SCENARIO B2: Renovation of 10 % of the non-renovated GFA as of 1 January 2016;
- ✓ SCENARIO C1: Renovation of 7 % of the non-renovated GFA remaining as of 1 January of the next year;
- ✓ SCENARIO C2: Renovation of 7 % of the non-renovated GFA as of 1 January 2016.

The scenarios were analysed for the two key ownership groups: State and municipal.

State-owned buildings

Taking into account the parameters of the State-owned buildings occupied by the central administration and included in the National Plan for the improvement of the energy performance of heated and/or cooled buildings

occupied by the State administration, the total number of remaining non-renovated buildings in this group is 993 with a combined GFA of 2 329 174 m^2. Figure 2.1-1 shows the possible share of renovated GFA of State-owned public service buildings under the different scenarios over various periods of time.



	2020	2025	2030	2035
Сценарий Б2	50.00%	100.00%		
Сценарий В2	35.00%	70.00%	100.00%	
Сценарий А2	25.00%	50.00%	75.00%	100.00%
Сценарий А1	22.62%	40.13%	53.67%	64.15%
Сценарий Б1	40.95%	65.13%	79.41%	87.84%
Сценарий В1	30.43%	51.60%	66.33%	76.58%

Figure 2.1-1: Cumulative share of GFA renovation for the group of State-owned buildings

Key

	2020	2025	2030	2035
Scenario B2 (purple bars)	50.00 %	100.00 %		
Scenario C2 (brown bars)	35.00 %	70.00 %	100.00 %	
Scenario A2 (Bordeaux bars)	25.00 %	50.00 %	75.00 %	100.00 %
Scenario A1 (dark blue bars)	22.62 %	40.13 %	53.67 %	64.15 %
Scenario B1 (green bars)	40.95 %	65.13 %	79.41 %	87.84 %
Scenario C1 (pale blue bars)	30.43 %	51.60 %	66.33 %	76.58 %

The results demonstrate that only three scenarios can achieve 100 % renovation of the building stock in this group by 2035.

Table 2.1-1 presents the forecast results by 2020, obtained in the six scenarios for State-owned buildings excluding those occupied by the central administration.

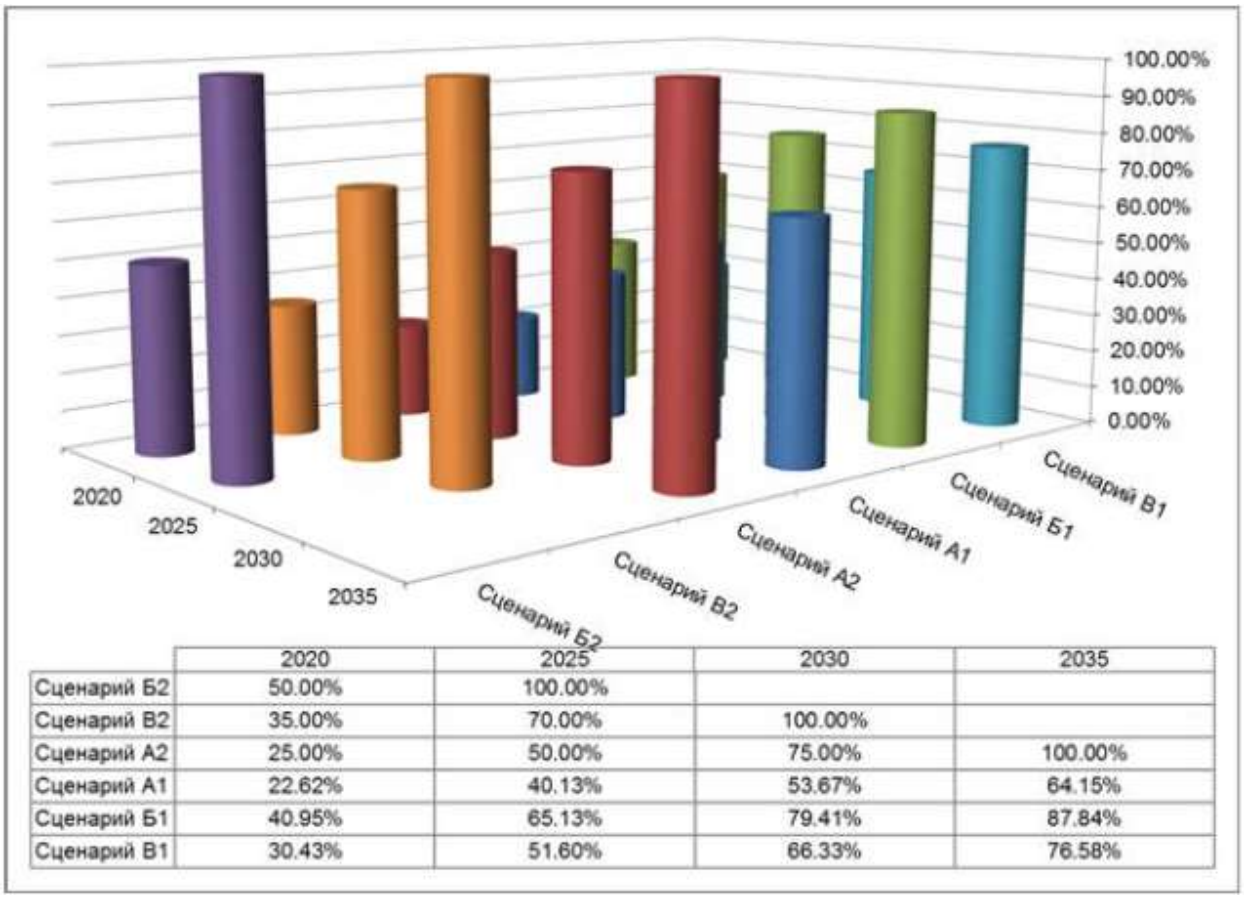
Table 2.1-1: Results of the different scenarios for the renovation of State-owned buildings excluding those occupied by the central administration

SCENARIO A1: Renovation of 5 % of the remaining non-renovated GFA						**SCENARIO A2: Renovation of 5 % of the non-renovated GFA as of 01.01.2016**					
	State-owned buildings excluding those occupied by the central administration						State-owned buildings excluding those occupied by the central administration				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	116 459	17 468 808	1.24	14.38	1 746.88	2016	116 459	17 468 808	1.24	14.38	1 746.88
2017	110 636	16 595 368	1.18	13.66	1 659.54	2017	116 459	17 468 808	1.24	14.38	1 746.88
2013	105 104	15 765 599	1.12	12.98	1 576.56	2018	116 459	17 468 808	1.24	14.38	1 746.88
2019	99 849	14 977 319	1.06	12.33	1 497.73	2019	116 459	17 468 808	1.24	14.38	1 746.88
2020	94 856	14 228 453	1.01	11.72	1 422.85	2020	116 459	17 468 808	1.24	14.38	1 746.88
Total	**526 904**	**79 035 547**	**12.77**	**148.54**	**18 039.83**	**Total**	**582 294**	**87 344 040**	**13.61**	**158.22**	**19 215.69**
SCENARIO B1: Renovation of 10 % of the remaining non-renovated GFA						**SCENARIO B2: Renovation of 10 % of the non-renovated GFA as of 01.01.2016**					
	State-owned buildings excluding those occupied by the central administration						State-owned buildings excluding those occupied by the central administration				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	232 917	34 937 616	2.47	28.77	3 493.76	2016	232 917	34 937 616	2.47	28.77	3 493.76
2017	209 626	31 443 854	2.23	25.89	3 144.39	2017	232 917	34 937 616	2.47	28.77	3 493.76
2018	188 663	28 299 469	2.00	23.30	2 829.95	2018	232 917	34 937 616	2.47	28.77	3 493.76
2019	169 797	25 469 522	1.80	20.97	2 546.95	2019	232 917	34 937 616	2.47	28.77	3 493.76
2020	152 817	22 922 570	1.62	18.87	2 292.26	2020	232 917	34 937 616	2.47	28.77	3 493.76
Total	**953 820**	**143 073 031**	**24.01**	**279.19**	**33 907.31**	**Total**	**1 164 587**	**174 688 079**	**27.21**	**316.45**	**38 431.38**
SCENARIO C1: Renovation of 7 % of the remaining non-renovated GFA						**SCENARIO C2: Renovation of 7 % of the non-renovated GFA as of 01.01.2016**					
	State-owned buildings excluding those occupied by the central administration						State-owned buildings excluding those occupied by the central administration				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	163 042	24 456 331	1.73	20.14	2 445.63	2016	163 042	24 456 331	1.73	20.14	2 445.63
2017	151 629	22 744 388	1.61	18.73	2 274.44	2017	163 042	24 456 331	1.73	20.14	2 445.63
2013	141 015	21 152 281	1.50	17.42	2 115.23	2018	163 042	24 456 331	1.73	20.14	2 445.63
2019	131 144	19 671 621	1.39	16.20	1 967.16	2019	163 042	24 456 331	1.73	20.14	2 445.63
2020	121 964	18 294 608	1.30	15.06	1 829.46	2020	163 042	24 456 331	1.73	20.14	2 445.63
Total	**708 795**	**106 319 229**	**17.44**	**202.83**	**24 632.93**	**Total**	**815 211**	**122 281 655**	**19.05**	**221.51**	**26 901.96**

Buildings owned by municipalities

According to the information available in the AUER database, the total number of non-renovated buildings in this group is 3 825 with a combined GFA of 5 341 458 m^2.

Figure 2.2-2 presents the results for the possible share of renovated GFA under the scenarios analysed, over a period of time, for the group of municipality-owned buildings.



	2020	2025	2030	2035
Сценарий Б2	50.00%	100.00%		
Сценарий В2	35.00%	70.00%	100.00%	
Сценарий А2	25.00%	50.00%	75.00%	100.00%
Сценарий А1	22.62%	40.13%	53.67%	64.15%
Сценарий Б1	40.95%	65.13%	79.41%	87.84%
Сценарий В1	30.43%	51.60%	66.33%	76.58%

Figure 2.2-2: Cumulative share of GFA renovation in buildings owned by municipalities

Key

	2020	2025	2030	2035
Scenario B2 (purple bars)	50.00 %	100.00 %		
Scenario C2 (brown bars)	35.00 %	70.00 %	100.00 %	
Scenario A2 (Bordeaux bars)	25.00 %	50.00 %	75.00 %	100.00 %
Scenario A1 (dark blue bars)	22.62 %	40.13 %	53.67 %	64.15 %
Scenario B1 (green bars)	40.95 %	65.13 %	79.41 %	87.84 %
Scenario C1 (pale blue bars)	30.43 %	51.60 %	66.33 %	76.58 %

Similar to the group of State-owned buildings, the results demonstrate that only three scenarios can achieve 100 % renovation of the building stock by 2035.

Table 2.2-2 presents the forecast results by 2020, obtained in the six scenarios for buildings owned by municipalities.

Table 2.2-2: Results from the different scenarios for the renovation of municipal buildings

SCENARIO A1: Renovation of 5 % of the remaining non-renovated GFA						**SCENARIO A2: Renovation of 5 % of the non-renovated GFA as of 01.01.2016**					
	Buildings owned by municipalities						Buildings owned by municipalities				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	267 073	40 060 931	2.84	32.99	4 006.09	2016	267 073	40 060 931	2.84	32.99	4 006.09
2017	253 719	38 057 885	2.69	31.34	3 805.79	2017	267 073	40 060 931	2.84	32.99	4 006.09
2013	241 033	36 154 991	2.56	29.77	3 615.50	2018	267 073	40 060 931	2.84	32.99	4 006.09
2019	228 982	34 347 241	2.43	28.28	3 434.72	2019	267 073	40 060 931	2.84	32.99	4 006.09
2020	217 533	32 629 879	2.31	26.87	3 262.99	2020	267 073	40 060 931	2.84	32.99	4 006.09
Total	**1 208 340**	**181 250 927**	**29.30**	**340.65**	**41 370.45**	**Total**	**1 335 364**	**200 304 657**	**31.20**	**362.85**	**44 067.02**
SCENARIO B1: Renovation of 10 % of the remaining non-renovated GFA						**SCENARIO B2: Renovation of 10 % of the non-renovated GFA as of 01.01.2016**					
	Buildings owned by municipalities						Buildings owned by municipalities				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	534 146	80 121 863	5.67	65.97	8 012.19	2016	534 146	80 121 863	5.67	65.97	8 012.19
2017	480 731	72 109 677	5.11	59.38	7 210.97	2017	534 146	80 121 863	5.67	65.97	8 012.19
2018	432 658	64 898 709	4.60	53.44	6 489.87	2018	534 146	80 121 863	5.67	65.97	8 012.19
2019	389 392	58 408 838	4.14	48.09	5 840.88	2019	534 146	80 121 863	5.67	65.97	8 012.19
2020	350 453	52 567 954	3.72	43.28	5 256.80	2020	534 146	80 121 863	5.67	65.97	8 012.19
Total	**2 187 380**	**328 107 040**	**55.06**	**640.27**	**77 759.07**	**Total**	**2 670 729**	**400 609 314**	**62.41**	**725.70**	**88 134.05**
SCENARIO C1: Renovation of 7 % of the remaining non-renovated GFA						**SCENARIO C2: Renovation of 7 % of the non-renovated GFA as of 01.01.2016**					
	Buildings owned by municipalities						Buildings owned by municipalities				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	373 902	56 085 304	3.97	46.18	5 608.53	2016	373 902	56 085 304	3.97	46.18	5 608.53
2017	347 729	52 159 333	3.69	42.95	5 215.93	2017	373 902	56 085 304	3.97	46.18	5 608.53
2013	323 388	48 508 179	3.43	39.94	4 850.82	2018	373 902	56 085 304	3.97	46.18	5 608.53
2019	300 751	45 112 607	3.19	37.15	4 511.26	2019	373 902	56 085 304	3.97	46.18	5 608.53
2020	279 698	41 954 724	2.97	34.55	4 195.47	2020	373 902	56 085 304	3.97	46.18	5 608.53
Total	**1 625 468**	**243 820 147**	**40.00**	**465.14**	**56 490.29**	**Total**	**1 869 510**	**280 426 520**	**43.69**	**507.99**	**61 693.83**

2.2 Residential buildings

As of 1 January 2016, the combined GFA of non-renovated residential buildings was 232 865 230 m^2. Six potential scenarios for the renovation of these buildings were again analysed and developed on the basis of two assumptions regarding the basis on which renovation can be realised:

- Fixed basis renovation – different proportions (1 %, 1.5 % or 2.5 %) of all non-renovated GFA as of 1 January 2016 is renovated, or 1 489 117 m^2, regardless of how much non-renovated GFA remains each year: Scenarios A2, B2 and C2;
- Floating basis renovation — different proportions (1 %, 1.5 % or 2.5 %) of the non-renovated GFA remaining as of 1 January of the next year are renovated: Scenarios A1, B1 and C1.

✓ SCENARIO A1:	Renovation of 1 % of the non-renovated GFA remaining as of 1 January of the next year;
✓ SCENARIO A2:	Renovation of 1 % of the non-renovated GFA as of 1 January 2016;
✓ SCENARIO B1:	Renovation of 1.5 % of the non-renovated GFA remaining as of 1 January of the next year;
✓ SCENARIO B2:	Renovation of 1.5 % of the non-renovated GFA as of 1 January 2016;
✓ SCENARIO C1:	Renovation of 2.5 % of the non-renovated GFA remaining as of 1 January of the next year;
✓ SCENARIO C2:	Renovate 2.5 % of the non-renovated GFA as of 1 January 2016.

Figure 2.2-1 presents the results for the possible share of renovated GFA under the scenarios analysed, over a period of time, for the residential buildings group.

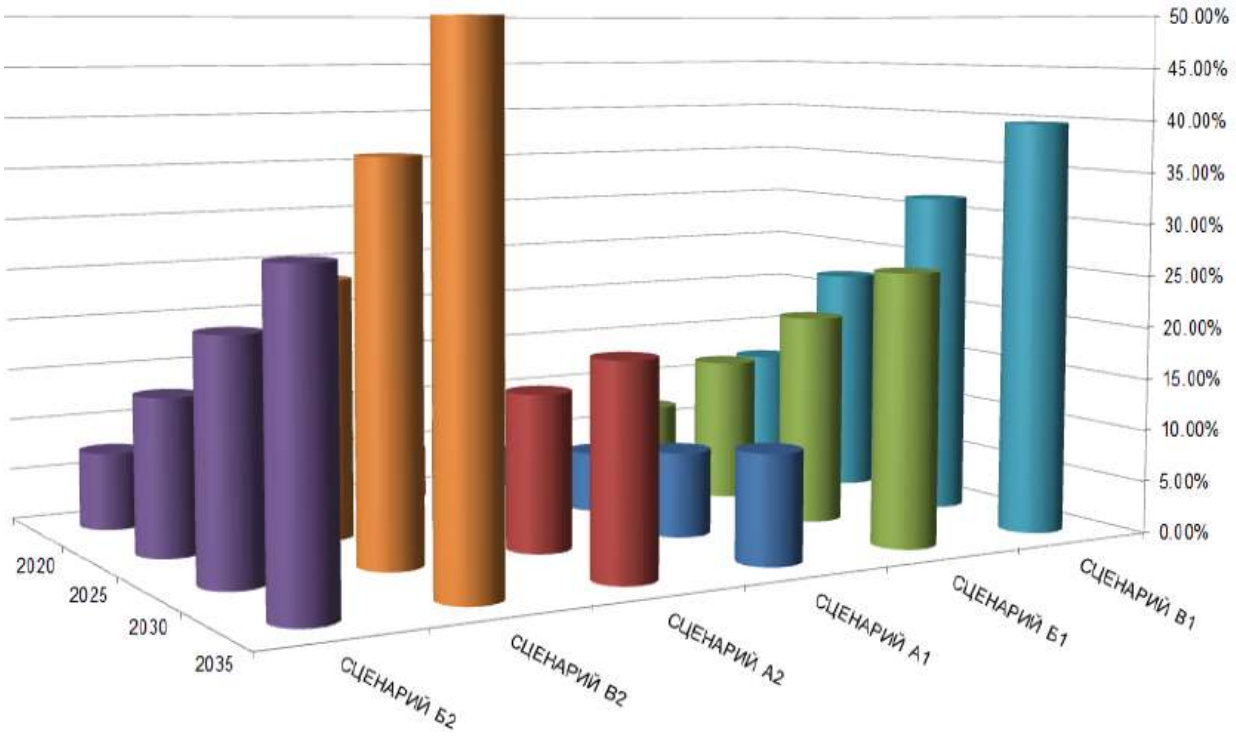


Figure 2.2-1: Cumulative share of GFA renovation in the residential buildings group

Key

	2020	2025	2030	2035
Scenario B2 (purple bars)	7.50 %	15.00 %	22.50 %	30.00 %
Scenario C2 (brown bars)	12.50 %	25.00 %	37.50 %	50.00 %
Scenario A2 (Bordeaux bars)	5.00 %	10.00 %	15.00 %	20.00 %
Scenario A1 (dark blue bars)	3.45 %	5.84 %	8.17 %	10.45 %
Scenario B1 (green bars)	7.28 %	14.03 %	20.28 %	26.09 %
Scenario C1 (pale blue bars)	11.89 %	22.37 %	31.60 %	39.73 %

Scenario A2 emerges as the most appropriate one to implement. This scenario will ensure the renovation of 5 % of the non-renovated residential GFA by 2020. The other scenarios (except A1) are more optimistic and can be applied after the first progress review with regard to the implementation of the Programme, in case the results achieved after the implementation of Scenario A2 are unsatisfactory.

Table 2.2-1 shows the forecast results by 2020 obtained in the six scenarios for residential buildings.

Table 2.2-1: Results from the different scenarios for the renovation of residential buildings

SCENARIO A1: Renovation of 1 % of the remaining non-renovated GFA						**SCENARIO A2: Renovation of 1 % of the non-renovated GFA as of 01.01.2016**					
	Residential buildings						Residential buildings				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	2 328 652	349 297 845	25.81	300.15	34 929.78	2016	2 328 652	349 297 845	25.81	300.15	34 929.78
2017	2 305 366	345 804 867	25.55	297.15	34 580.49	2017	2 328 652	349 297 845	25.81	300.15	34 929.78
2013	1 141 156	171 173 409	12.65	147.09	1 117.34	2018	2 328 652	349 297 845	25.81	300.15	34 929.78
2019	1 135 450	170 317 542	12.59	146.35	17 031.75	2019	2 328 652	349 297 845	25.81	300.15	34 929.78
2020	1 129 773	169 465 954	12.52	145.62	16 946.60	2020	2 328 652	349 297 845	25.81	300.15	34 929.78
Total	**8 040 397**	**1 206 059 617**	**230.32**	**2 678.20**	**311 673.63**	**Total**	**11 643 262**	**1 746 489 225**	**283.94**	**3301.65**	**384 227.63**
SCENARIO B1: Renovation of 1.5 % of the remaining non-renovated GFA						**SCENARIO B2: Renovation of 1.5 % of the non-renovated GFA as of 01.01.2016**					
	Residential buildings						Residential buildings				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	3 492 978	523 946 767	38.72	450.23	52 394.68	2016	3 492 978	523 946 768	38.72	450.23	52 394.68
2017	3 440 584	516 087 566	38.14	443.47	51 608.76	2017	3 492 978	523 946 768	38.72	450.23	52 394.68
2018	3 388 975	508 346 252	37.57	436.82	50 834.63	2018	3 492 978	523 946 768	38.72	450.23	52 394.68
2019	3 338 140	500 721 059	37.00	430.27	50 072.11	2019	3 492 978	523 946 768	38.72	450.23	52 394.68
2020	3 288 068	493 210 243	36.45	423.81	49 321.02	2020	3 492 978	523 946 768	38.72	450.23	52 394.68
Total	**16 948 746**	**2 542 311 888**	**417.87**	**4 859.04**	**565 467.36**	**Total**	**17 464 892**	**2 619 733 838**	**425.91**	**4 952.48**	**576 341.44**
SCENARIO C1: Renovation of 2.5 % of the remaining non-renovated GFA						**SCENARIO C2: Renovation of 2.5 % of the non-renovated GFA as of 01.01.2016**					
	Residential buildings						Residential buildings				
Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)			Year	GFA, m^2	Investments, BGN	Savings (FEC and emissions)		
			ktoe	GWh	t CO_2				ktoe	GWh	t CO_2
2016	5 821 631	873 244 613	64.53	750.38	87 324.46	2016	5 821 631	873 244 613	64.53	750.38	87 324.46
2017	5 676 090	851 413 497	62.92	731.62	85 141.35	2017	5 821 631	873 244 613	64.53	750.38	87 324.46
2013	5 534 188	830 128 160	61.35	713.33	83 012.82	2018	5 821 631	873 244 613	64.53	750.38	87 324.46
2019	5 395 833	809 374 956	59.81	695.49	80 937.50	2019	5 821 631	873 244 613	64.53	750.38	87 324.46
2020	5 260 937	789 140 582	58.32	678.11	78 914.06	2020	5 821 631	873 244 613	64.53	750.38	87 324.46
Total	**27 688 679**	**4 153 301 807**	**687.70**	**7996.61**	**930 599.08**	**Total**	**29 108 154**	**4 366 223 063**	**709.85**	**8254.14**	**960 569.07**

3. POLICIES AND MEASURES TO PROMOTE ECONOMICALLY EFFICIENT MAJOR IMPROVEMENT OF ENERGY PERFORMANCE OF BUILDINGS

3.1 Measures in the context of the State's energy efficiency policy

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
1. Energy efficiency programmes at municipal level, consistent with the objectives set in the acts under Article 4 and in items 1–4 of Article 5(3) of the ZEE, to be developed by municipal administrations and adopted by municipal councils. These programmes should be developed/updated in line with the objectives laid down in the acts under Article 4 and in items 1–4 of Article 5(3) of the ZEE. In addition to energy saving measures for the buildings, the programmes should include on-the-job activities, strengthening the administrative capacity for the implementation of energy efficiency projects and energy management as part of the use of the building. Each programme should ensure that results are monitored and should provide for appropriate measures where the programme fails to make satisfactory progress. Designated managers at senior level will steer the implementation of the measure.	Administrative	Ongoing	2020	Provincial and municipal administrations	Energy efficiency programmes at municipal level developed and adopted by municipal councils	Within the budget approved for the respective year. Public-private partnerships (PPPs) with obligated parties as per Article 14(4) of the ZEE or with ESCO

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
2. Developing a scenario for renovation and improvement of the energy performance of buildings.	Administrative	Planned	2017	ME, MRRB, AUER	The documents referred to in items 1, 3 and 4 of Article 5(3) of the ZEE approved by the Council of Ministers	Does not require funding
3. Updating the integrated urban regeneration and development plans of municipalities in order to include investment projects consistent with the objectives and scenarios for implementation of the acts under items 1–4 of Article 5(3) of the ZEE.	Regulatory	Planned	2017–2018	Municipalities Municipal mayors Presidents of municipal councils	Completed building renovation projects in accordance with the programmes referred to in Article 5(3), including for nearly zero-energy buildings	OPRG 2014–2020 NTEF FEEVI Other energy efficiency programmes

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
4. Training, education and control activities aimed at strengthening the administrative capacity for implementation of measures related to energy efficiency and renewable sources.	Education	Planned	2016–2020	The ME as a programme operator for Procedure BG 04 04-05 'Training to strengthen the administrative capacity in respect of measures related to energy efficiency and renewable sources'.	Trained experts from central and municipal administrations	Programme BG04 'Energy efficiency and renewable energy' funded by the Financing mechanism of the EEA Municipal budgets
5. Expanding the scope of the work of energy centres/expert panels at municipal level by adding activities related to monitoring of the results of energy efficiency projects completed in the territory of the respective municipality.	Administrative	Planned	2017–2020	Municipalities in partnership with universities, energy agencies and firms specialised in the audit and certification of buildings	Increased administrative capacity of municipal administrations for the implementation and monitoring of projects on energy efficiency.	EU technical assistance programmes Within the approved municipal budgets

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
6. Developing a national cost-benefit analysis for the territory of Bulgaria based on climatic conditions, economic viability and technical compatibility in accordance with Annex IX Part 1 of Directive 2012/27/EU, in order to identify the most resource- and cost-efficient solutions to meet the demand for heating/cooling energy in Bulgaria. The analysis examines the national potential for high-efficiency cogeneration.	Regulatory	Completed	2016	The ME in partnership with the NSI and AUER	Compliance with the obligation under Article 14 of Directive 2012/27/EU	The budget of the ME
7. Creating a national database (list) of obligated parties as per Article 14(4) of the ZEE. The list is made available to the AUER for the Agency to exercise control on compliance by these parties with their obligations and on the assessments of the energy savings achieved.	Administrative	Planned	2017	The KEVR and AUER	List with detailed administrative data of obligated parties as per Article 14(4) of the ZEE, including data exchange agreement concluded between AUER and NSI.	Within the approved budget of KEVR and AUER
8. Introducing an innovative approach to develop, maintain and update an efficient and central electronic database of the energy performance of buildings in Bulgaria to inform the development and reporting of national plans and programmes.	Administrative	Planned	2017–2018	The AUER in collaboration with the MRRB and universities	An efficient electronic database	EU programmes Within the approved AUER budget

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
9. Full and standardised updating of the database of the energy performance of State-owned, municipal and residential buildings in Bulgaria.	Administrative	Planned	2017–2018	AUER, MRRB	Updated energy performance database of the buildings stock	Within the approved budgets of the AUER and MRRB
10. Implementing the National programme for the energy efficiency of multifamily residential buildings in Bulgaria.	Investment	Ongoing	2016–2019	MRRB	Energy savings in residential buildings, GFA renovated in accordance with the objectives of the Programme	The Bulgarian Development Bank through the EIB
11. Developing a concept for funding of the next phase of the National programme for the energy efficiency of multifamily residential buildings in Bulgaria with a focus of market-based financing mechanisms	Regulatory and investment	Ongoing	2017–2018	MRRB	Updated National programme for the energy efficiency of multifamily residential buildings in Bulgaria	Within the approved budget of the MRRB

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
12. Continuing training for consumers, builders, architects, engineers, energy efficiency consultants and installers of buildings components and systems to promote available energy efficiency mechanisms and the financial/legal framework in Bulgaria. The measure is being implemented in accordance with Articles 16 and 17 of Directive 2012/27/EU and is linked to the requirements set out in Directive 2010/31/EU.	Education	Ongoing	2016–2020	Universities, the AUER, professional associations	Improved professional qualification and skills for conducting energy audits of buildings and for design and implementation of energy saving measures in buildings.	Public-private partnerships EU programmes including programmes for cooperation with other Member States
13. Including residential buildings in the mandatory energy efficiency certification scheme and carrying out other legislative changes to ensure more appropriate and efficient application of the Union's law in regard to energy efficiency in Bulgaria.	Legislative	Completed	2016	The ME in collaboration with the MRRB, AUER and other institutions	Amended ZEE	Does not require funding

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
14. Implementing energy management at the central executive agencies, regional administrations and municipalities.	Administrative and regulatory	Planned	2020	Ministries, agencies, regional administrations and municipal administrations in partnership with external experts in this field	Energy management system implemented in buildings owned by the State and municipalities	Public-private partnership with obligated parties as per Article 14(4) of the ZEE or with ESCO. Within the approved budgets of the ministries. Within the approved budgets of the municipalities. EU programmes and relevant instruments
15. Developing and implementing a National programme for creating a sustainable model of end-user behaviour aimed at efficient energy use in buildings. The Programme is planned in accordance with Article 12 of Directive 2012/27/EU.	Institutional and horizontal	Planned	2018–2020	Universities and private organisations in partnership with responsible institutions	Successful launch of a programme to inform and empower end-users of energy	EU programmes and relevant instruments Public-private partnership

Title of the measure in the context of the State's energy efficiency policy	*Type of the measure*	*Status of the measure*	*Implement by*	*Responsible institution and related partner institutions*	*Expected result*	*Potential financing sources*
16. Implementing a white certificates trading scheme	Legislative	Planned	2020	ME, AUER, MF	A new financial incentive introduced in the market for energy services	Private investments

3.2 Analysis and assessment of existing barriers to the improvement of energy efficiency

Improvement of energy efficiency requires a systemic and holistic approach, and concerted implementation efforts. This in turn requires analysis, assessment and regular review of the barriers. The challenge is to design a policy framework which works to dismantle the barriers while ensuring sufficient information, incentives and capacity to support the initiative of owners and investors to undertake the steps necessary.

Macroeconomic barriers to the funding of projects

Institutional barriers: The rules and practices existing in various countries, including Bulgaria, do not always contribute sufficiently to the improvement of energy efficiency. A concerted effort is needed to address this issue.

External factors: The benefits brought about by the improvement of energy efficiency, to society in general and to the environment, energy security, social policy and employment in particular, are too complex and therefore not easily measurable. This is why they do not provide sufficient incentive for investments in energy efficiency.

Barriers related to the specifics of the housing sector

While energy savings potential is the highest in residential buildings, which is why they are the main target group of the National programme for the energy efficiency of multifamily residential buildings, it is difficult to implement the policies and measures for improving energy efficiency in these buildings because of the following factors:

Barriers related to information and motivation: Consumers fail to realise that energy efficiency is a major issue since energy expenditure tends to be lower than the price of many other factors. The majority of users do not believe that the expected energy savings are worth the time and effort to obtain sufficient information in order to decide whether to request financial support for the implementation of energy saving measures. Many surveys have confirmed that households persistently underestimate the benefits of the implementation of these measures, and overestimate the time, costs and effort involved. Consumers should therefore be provided with all relevant information and with assurance that the proposed measures, including the mechanisms for monitoring and control, will ensure the achievement of the expected results and benefits identified in audits and investment projects. Furthermore, there should be sufficient choice of certified contractors able to carry out the activities involved in the application of the measures, in compliance with certain minimum quality standards.

Legal, regulatory and organisational barriers: Practical experience shows that most issues stem from the diverse social, financial, age and psychological profiles of apartment owners, which leads to an ill-functioning mechanism for the management of condominium buildings. Improving the legal framework in which condominium buildings operate is an important precondition for the deployment of a broad residential renovation process.

Barriers related to project specifics

Energy efficiency projects reduce energy costs over time; however, it is always difficult to weigh long-term

benefits against short-term cost.

Size of projects/investments: The average size of energy efficiency projects is often modest compared to the mainstream loans offered by commercial banks, which makes them less attractive to banking institutions. Moreover, energy efficiency projects typically involve more *soft* expenditure than traditional loans. Practical experience shows that market mechanisms fail to resolve the issue of project consolidation so as to create large-scale profitable opportunities.

Uncertainty related to energy savings: Generally, a carefully selected package of measures can lead to a predictable level of savings; however, they can never be guaranteed to a certain level with regard to the individual dwellings. Systemic ex-post assessments are considered expensive exercises and their practical use has failed to take off. Accordingly, the perceived uncertainty about the energy savings that may be achieved often scares developers and owners away from market-based investments in energy efficiency.

Risk assessment and management: Energy efficiency projects are integrated solutions whose energy savings are not yet sufficiently guaranteed to make the assets usable as collateral for bank loans. Furthermore, the presence of multiple owners in the residential sector often makes it impossible to control energy use and hence the results achieved by a particular measure. This limits the potential of purely market models for the financing of energy efficiency projects, e.g. by using energy services providers (ESCO model).

Barriers to market-based funding of projects

Price and accessibility of financial resources: Energy savings measures are not cheap exercises, in particular when they come in a package prescribed on the basis of an energy efficiency audit. Practical experience shows that users tend to choose the least efficient options, insofar as the choice is left to them, simply because of the lower initial costs. Moreover, access to borrowing for renovation projects is still underdeveloped.

Risk exposure: For financiers, the ratio of potential risk to return on investment for a given project is an important indicator for the soundness of the investment; and of even greater importance is the assessment of the borrower's creditworthiness Energy efficiency projects usually fail to meet the generally accepted criteria used for assessing the financial risk of a project. Commercial banks choose to finance safe investment projects with an average return on investment, while considering investments in residential energy savings measures too risky and insecure.

Furthermore, extending loans to homeowner associations in multifamily buildings is a practice which is unknown in Bulgaria. Banks take the view that legitimate borrowers are natural and legal persons capable of providing the kind of collateral they are used to. Although many European countries have for years been applying what from the Bulgarian perspective are innovative approaches, there is little sign of such approaches being adopted by the local banking community.

Investment payback period: Energy efficiency projects in residential buildings typically have longer payback periods than most mainstream investments, which is one of the main reasons why they are not highly appreciated by commercial banks. Using the payback period as the main criterion of the efficiency of such investments is

inappropriate because it does not take into account other important factors such as the overall improvement of wellbeing, improvement of living/sanitary conditions, or job creation. In this regard, considering only the payback period is a major barrier to market-based funding of energy efficiency projects.

Information, awareness and communication: Commercial banks have only modest practice in financing comprehensive energy efficiency projects in residential buildings due to the perception that these projects are more complicated than traditional lending and their implementation requires expert knowledge, additional efforts and expenses. At the same time, creation of sustainable financing mechanisms cannot be achieved without the participation of commercial banks.

Lack of adequately skilled and experienced personnel: The majority of actors in the financing and implementation of energy efficiency projects lack adequate background and knowledge in this area. Suppliers, manufacturers and bankers do not have the appropriate skills to promote adequately energy efficiency products to their clients. A targeted, long-term and comprehensive education programme is required in order to build a critical mass of experts in the field of energy efficiency.

4. CREATING A FINANCIAL FRAMEWORK TO GUIDE INVESTMENT DECISIONS OF INVESTORS, BUILDERS AND FINANCIAL INTERMEDIARIES

4.1 White certificates trading scheme

The Bulgarian scheme was developed within project BG161P0003-4.3.03-0001-C0001, Strengthening the institutional capacity of the Sustainable Energy Development Agency to provide more and better services in the field of energy efficiency. The project was implemented under Operational Programme Development of the Competitiveness of the Bulgarian Economy 2007–2013, co-funded by the European Union through the European Regional Development Fund.

The project falls within the scope of Priority axis 4 of the Operational Programme, Strengthening the international market positions of Bulgarian economy, namely: improving the national quality infrastructure and provision of more and better business services.

The scheme was developed with the following participants:

Obligated parties

Pursuant to Article 14(4) of the ZEE these are energy traders which are:

- ✓ end suppliers, providers of last resort, traders holding a licence for the activity of 'trading in electricity' having annual sales of electricity to end-users of more than 20 GWh;
- ✓ heat transmission undertakings and heat energy suppliers having annual sales of heat energy to end-users of more than 20 GWh;
- ✓ end suppliers and traders in natural gas having annual sales to end-users of more than 1 million cubic metres;
- ✓ traders in liquid fuels having annual sales to end-users of more than 6.5 kt liquid fuels, with the exception of fuels for transport purposes;
- ✓ traders in solid fuels having annual sales to end-users of more than 13 kt solid fuels.

Obligated parties are expected to be the main participants in this scheme, because in case they are not able to fulfil fully their individual targets (obligations under the ZEE) by direct implementation of energy saving measures at end-users, they will be able to realise them by purchasing the respective number of white certificates. The certificates may be purchased by trading with other obligated parties or non-obligated holders of this type of securities. Essentially this is market-based trading in energy savings, which is expected to add momentum to the energy service sector, stimulate the implementation of more and better energy saving measures, and strengthen the competitiveness of participants in the scheme in the long-term. It can thus be expected to improve the state of the economy in general and of the energy sector in particular.

Non-obligated parties

Non-obligated parties are all stakeholders, including the owners of properties in which energy saving measures

are applied, as well as the persons who have implemented them. The introduction of this mechanism creates conditions to encourage the persons who decide to invest in improving the quality of their life by initiating, willingly or urged by circumstances, various energy saving measures to improve workplace standards, private living spaces, production systems, etc.

Obligated parties will also be able to purchase the necessary white certificates from non-obligated parties in order to cover the individual targets they fail to fulfil. By introducing this mechanism, non-obligated parties will be able to obtain additional financial incentive for the measures applied, as they will be enabled to sell their white certificates. Non-obligated parties will be able to trade their white certificates directly to obligated parties by means of a bilateral contract or at a stock exchange (via a licensed broker). This will provide an additional incentive for the realisation of investments, thereby improving Bulgaria's energy efficiency sector.

End-users of energy

Proactive end-users will also benefit from this scheme, since they will be the final beneficiaries of the energy savings that had already been achieved. This will lead to a reduction in energy consumption, respectively lower energy costs, which will improve quality of life. Another potential benefit for end-users will be the option for them to acquire white certificates for the realisation of energy savings, which they can then trade and realise a financial profit in this way.

Other actors in the process

The successful implementation of the white certificates trading mechanism is expected to lead to more sustainable energy production and use by creating additional market opportunities for financial institutions (because of the nature of the mechanism, namely trading in securities), providers of highly efficient technologies (stimulate the implementation of energy savings measures) subsequent demand for skilled personnel.

4.2 Financial incentives for investors in nearly zero-energy buildings

The following financial schemes are available to guide investment decisions of investors, builders and financial intermediaries as regards the construction of new buildings or the renovation of existing buildings to nearly zero-energy levels as per the scale of energy consumption classes:

- Grand financing (10–20 %) for proven energy saving technology which ensures a nearly zero-energy for the building (Class A and at least 55 % recovery of energy from renewable sources). The measure is appropriate for the renovation of existing buildings which have been in use for 30 years or more by applying energy saving measures that lead to an energy efficiency level exceeding the minimum requirements. The measure is not appropriate for new buildings because they must all be zero-energy buildings after 2018;
- Applying the mechanism *Preferential loans for high-efficiency buildings (individual houses or apartments)*. The mechanism is applicable both to new and existing buildings and can be implemented through banking institutions or directly by investors. It is successful where the loan interest is linked to the energy efficiency of the building, i.e. better energy performance of the building means better terms of the loan;
- Credit lines targeting environmental, energy efficiency and renewable energy sources projects. This mechanism is successfully applied in Bulgaria;
- Extending the financial portfolio of the Energy Efficiency and Renewable Sources Fund (FEEVI) by adding new packages to finance projects aimed at improving the energy efficiency in buildings;
- Setting up energy efficiency funds at municipal level.

4.3 Developing and applying a socially-driven business model of entrepreneurship aimed at the construction and offering of social housing for deprived persons, branded as Social Enterprise Product.

The mechanism is successful where it creates a clear market profile and legal recognition of social construction enterprises as fully fledged market entities that provide services of general economic interest. Their equal treatment within the internal market for social services is not common in Bulgaria and its application by building companies is limited or non-existent.

The mechanism is closely linked to the National Social Economy Concept of the Ministry of Labour and Social Policy. The concept ‘expresses the State’s social commitment to the establishment and strengthening of a favourable environment for the realisation and development of models and practices in the area of social economy in the Republic of Bulgaria’.

The mechanism includes startup enterprises and/or organisations in the construction sector which are established especially for the social purpose to build social housing. These companies streamline their activities so as to achieve diverse results. As the National Social Economy Concept indicates, social economy is simultaneously part of the real economy and of civil society where individuals and/or legal entities, volunteer associations and

other organised entities conduct business to the benefit of society and reinvest the profit in order to achieve social goals. It is known that social enterprises are managed as businesses, produce goods and services for the market economy and allocate part of their resources to the achievement of social and environmental objectives. From a business location perspective, social enterprises are positioned between the traditional private sector and the traditional public sector, which provides new opportunities for the building industry in combination with the benefits of energy efficiency in buildings. Creating this profile of construction companies will help support small and medium-sized enterprises, because the majority of social enterprises are exactly SMEs regardless of their legal status. EU law provides a solid basis which supports social economy in general.

The mechanism requires both amendments to legislation and change of the practices of government bodies, and is a model for the integration of sectoral policies (housing and energy) with a focus on the direct social impact of the activities related to the construction and provision of social housing.

4.4 Operational Programme 'Regions in Growth' 2014–2016

4.1.1. Grant procedure BG16RFOP001-1.001-039 'Implementation of integrated plans for urban regeneration and development'

The grant procedure aims to support implementation of integrated plans for urban regeneration and development for sustainable and long-lasting resolution of the high concentration of economic, environmental and social problems in 39 cities of hierarchical level 1, 2 and 3 in accordance with the National concept for spatial development of Bulgaria 2013–2025.

Table 4.4.1-1: Financial resources of the grant procedure 'Implementation of integrated plans for urban regeneration and development', BGN

Investment priority	***Total grant amount (100 %)***	***ERDF co-financing (85 %)***	***National co-financing (15 %)***
1. Energy efficiency in administrative and residential buildings	410 014 803.11	348 512 582.64	61 502 220.47
2. Integrated urban transport	237 785 209.33	202 117 428.03	35 667 781.30
3. Urban environment	403 804 307.47	343 233 660.56	60 570 646.91
4. Social infrastructure	155 307 253.88	132 011 165.22	23 296 088.66
5. Educational infrastructure	165 647 819.01	140 800 647.63	24 847 171.38

7.1.2. Grant procedure BG16RFOP001-2.001 'Energy efficiency in peripheral areas'

Priority Axis 2 'Support for energy efficiency in support centres in peripheral areas' is designed to support the implementation of energy efficiency measures in public and residential buildings in small towns — municipal centres providing services to the surrounding peripheral areas. It corresponds to Thematic Objective 4 'Support for transition to a low-carbon economy in all sectors'. The activities under this priority axis will contribute to the achievement of the national indicative energy saving targets by 2020 in accordance with the NPDEE 2014–2020. The activities planned will lead to improved energy efficiency of buildings in the target territories, contributing directly to reducing energy end-use and indirectly to reducing greenhouse gases in small towns operating as support centres of the polycentric system in accordance with the National concept for spatial development 2013–2025.

The support provided by this priority axis aims to address adequately the problems of increased migration towards large and medium cities, ensure better quality of life and services offered, modernise the public infrastructure in the peripheral areas of the country, as well as promote urban-rural interactions.

The priority axis has two specific objectives: 'Improvement of the energy efficiency of the residential sector in support centres at level 4 of the national polycentric system', and 'Improvement of the energy efficiency of public buildings in support centres at level 4 of the national polycentric system'.

The specific beneficiaries of this grant procedure are 28 small town municipalities which are support centres at level 4 of the national polycentric system in accordance with the National concept for spatial development 2013–2025.

4.5 Residential energy efficiency credit line (REECL)

On 1 September 2016 the European Bank for Reconstruction and Development launched the third programming period of the Residential energy efficiency credit line, which made its debut in the Bulgarian market back in 2005. The aim is to carry forward the positive impact achieved by the Programme so far and respond to the need for further improvement of energy efficiency in Bulgaria's residential sector.

The credit line is a EUR 20 million financial mechanism for the funding of energy efficiency in the residential sector. The funding available is disbursed to Bulgarian commercial banks with a proven track record in loans to individuals, apartment owners associations and private service providers for residential energy efficiency projects. The energy saving measures include: energy-efficient windows; wall, roof and floor insulation; high-efficiency burners and biomass-fuelled boilers; solar water heaters; energy-efficient gas-fuelled boilers and systems; air-conditioning systems powered by heat pumps; integration of photovoltaic systems in buildings; district heating substations and building installations; recuperative ventilation systems, and energy-efficient lifts.

The implementation of energy saving measures in dwellings is further encouraged by additional grants of 10 % for eligible projects in houses comprising one or two self-contained residential units and of 20 % for projects in multifamily buildings containing three or more self-contained residential units. The funds are paid after all installation work is completed and verified by an independent consultant. The EUR 4.4 million grant is provided by the Kozloduy International Fund.

4.6 Energy Efficiency and Renewable Sources Fund (FEEVI)

The Energy Efficiency and Renewable Sources Fund (Bulgarian acronym: FEEVI) was established on the basis of the Energy Efficiency Act (of 2004) as a legal entity independent from state institutions. The Fund operates in accordance with the provisions of the Energy Efficiency Act, the Energy from Renewable Sources Act and the agreements concluded with the Donors. It is not included in the consolidated national budget. The initial capital of the FEEVI was raised entirely from grant contributions. The main donors are the UN's Global Environment Facility through the International Bank for Reconstruction and Development (the World Bank) which contributed USD 10 million, the Government of Austria (EUR 1.5 million), the Government of Bulgaria (BGN 3 million) and private Bulgarian sponsors.

The Fund operates as a financing institution by providing loans or loan guarantees and as a consultation centre. The FEEVI assists Bulgarian companies, municipalities and private individuals in developing energy efficiency investment projects. The Fund provides financing, co-financing or guarantees to other financial institutions.

The main principle in the management of the FEEVI is public-private partnership. The Fund operates in accordance with arrangements and rules developed with the technical assistance of the World Bank and approved by the Bulgarian Government. Users of the Fund are central and local authorities, enterprises, institutions (including educational institutions and hospitals), non-government organisations and individuals.

A specific feature of the Fund is that it develops and manages a wide range of financial products designed to support its clients: investment grants, loans, bridge financing, loan guarantees, capital investment, etc.

Favourable terms for the granting of various forms of financing are achieved by cooperation with and the involvement of other financial institutions (banks) in the support programmes.

Under the Fund's policy, loan-based financing is the main form of project support, making the fund 'renewable' and guaranteeing its financial stability.

4.7 National Trust EcoFund (NTEF)

The National Trust EcoFund was established in October 1995 under the Debt-for-Environment Swap Agreement between the Government of the Swiss Confederation and the Government of the Republic of Bulgaria.

Pursuant to Article 66(1) of the Environment Protection Act, the objective of the Fund is to manage the proceeds from the debt-for-environment and debt-for-nature swaps, from international trading in assigned amount units (AAUs) and the National Green Investments Scheme, from the sale of greenhouse gas emission allowances for aviation activities, as well as funds provided on the basis of other types of agreements with international, foreign or Bulgarian sources for financing environmental protection activities in the Republic of Bulgaria. The Fund contributes to the implementation of the policy of the Bulgarian Government and to the fulfilment of the country's international commitments in the area of environmental protection.

For the 2011–2014 period, under the National Green Investments Scheme proceeds from the sale of AAUs to Austria were used for the implementation of energy efficiency projects in 77 public buildings in Bulgaria (owned by municipalities and the State) in the total amount of BGN 27 445 418. The National Green Investments Scheme and the corresponding two contracts for sale of assigned amount units between Bulgaria and the Republic of Austria are implemented in accordance with Article 17 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. Proceeds from AAU sales are managed by the NTEF and are invested primarily in projects aimed at the improvement of energy efficiency in public buildings.

The National Trust EcoFund is an independent institution that is supported by the Bulgarian Government. The Fund manages:

- The Climate Investment Programme;

  In 2015 funds were provided under this programme, in the total amount of BGN 23 909 439, to realise EE projects in 49 public buildings in Bulgaria. Funding will also be provided for an additional 84 public projects in the total amount of over BGN 38 million.

- National Green investments Scheme;

  In 2015, proceeds from the sale of assigned amount units (AAUs) to Austria were allocated to EE projects in 12 public buildings in Bulgaria in the total amount of BGN 5 117 582.

- Debt-for-Environment;

- Pilot programme for rehabilitation of the environment;

- Fund for protected territories.

The concept of the national NZEB definition is fully coherent with the ideas and objectives of the programmes operated by the NDEF.

4.8 Energy savings performance contracts

This financing mechanism is regulated in Article 72 of the ZEE.

The subject of the energy savings performance contracts (i.e. ESCO contracts) is to implement measures for the improvement of energy efficiency in buildings, enterprises, and industrial and outdoor lighting systems where the means for repayment of the investment and of the remuneration due to the contractor come from the energy savings achieved.

End-users can be assignors under this type of contracts and the contractors can be providers of energy efficiency services. An ESCO contract is concluded after an energy efficiency audit is carried out and an energy performance certificate establishing the actual energy use status of the building is issued.

ESCO contracts are concluded in writing and contain at least the following elements:

- ✓ normalised energy consumption as established by the energy efficiency audit;
- ✓ a list of energy efficiency measures to be implemented, including the steps to be undertaken for implementing the measures and where appropriate the related costs;
- ✓ guaranteed energy savings, procedure and time limits for determining the savings after the implementation of the measures envisaged in the contract, as well as arrangements for measuring and verifying energy savings achieved, economies ensured, quality assurance and guarantees;
- ✓ obligation to fully implement the measures in the contract and keep record of all changes made during the project;
- ✓ description of the financial implications of the project and distribution of the financial savings achieved between the two parties;
- ✓ financing method;
- ✓ method for payment of the remuneration;
- ✓ other clauses such as provisions related to amendments of the framework conditions with regard to the content and performance of the contract, inclusion of equivalent requirements to any subcontracting agreement with third parties, as well as detailed information on the obligations of each contracting party and penalties for the non-performance of these obligations.

A specific feature of these contracts is that the ESCO contractor arranges for the provision of all or part of the service with its own financial resources and/or commits to securing financing from a third party. The ESCO contractor bears all financial, technical and commercial risks associated with the implementation of the energy efficiency measures and activities provided in the contract and with achievement of the result guaranteed by the contract.

If a contract under Article 72(1) of the ZEE is concluded for state and/or municipal buildings, the state and/or the municipalities should allocate an amount in their budgets corresponding to the normalised energy consumption of these buildings during the term of the contract. The Ministry of Energy has issued instructions on the application of this financing mechanism. The providers of energy saving performance services (known as ESCO contractors) use their own resources for the provision of ESCO services and investments (surveying, implementation, operation and maintenance), and guarantee sufficient energy savings so that the investment can be repaid and a certain profit obtained. The agreement for the provision of energy efficiency services is regulated by a contract between the provider of energy saving performance services and its client. Implementation of the measures leads to reduction of energy-related, operational and building maintenance costs. When implementing ESCO service projects, the investment costs are repaid from the savings achieved. These projects are characterised by quick implementation and are in the mutual interest of both parties.

4.9 National programme for the energy efficiency of multifamily residential buildings

The National programme is intended to achieve both short-term and long-term goals at European level by addressing challenges such as climate change, energy security and depletion of resources.

The National programme is applied on the territory of all municipalities in the Republic of Bulgaria and has the following objectives:

- reducing energy use in households;
- reducing household expenditure;
- increasing the values of the properties;
- renovation of building entrances;
- achieving new and modern external appearance of residential buildings;
- creating warmer, cosier and better-looking homes.

Implementation of the National programme will bring about both economic benefits by increasing the economic activity of businesses (designers, builders, technical and energy efficiency auditors, producers of materials) and social benefits such as:

- ✓ provision of additional jobs;
- ✓ establishing traditions in the management of multifamily residential buildings;
- ✓ more disposable income for households;
- ✓ raising public awareness of energy efficiency improvement methods;
- ✓ better quality of life for those living in buildings made of prefabricated panels.

In early 2017 the budget of the Programme was increased to BGN 2 billion. The financing is in the form of 100 % grants, provided to buildings whose applications for the financing of renovation activities have been approved.

The general technical and financial administration of the National programme is realised by the municipalities.

In 2015, eligible for the Programme were all multifamily residential buildings constructed using industrial methods: large pre-cast panel residential construction; lift-slab construction; large-size formwork construction; climbing formwork construction and their variations, and comprising of at least 36 individual residential units.

As of 1 January 2016, eligible for financing under the Programme were also:

- multifamily residential buildings constructed using industrial methods: large pre-cast panel residential construction; lift-slab construction; large-size formwork construction; climbing formwork construction and their variations, consisting of three or more floors and at least 6 (six) and not more than 36 individual residential units;
- multifamily residential buildings (monolith buildings) designed before 26 April 1999, comprising of three or more floors and 6 (six) or more individual residential units.

The buildings mentioned above are eligible for funding only if they are not covered by projects proposed by municipalities under Priority Axis 1 and Priority Axis 2 of Operational Programme 'Regions in Growth' 2014–2020.

Works eligible for funding include:

- ✓ rehabilitation, strengthening and overhaul of the structure of multifamily residential buildings, depending on the extent of the damage incurred in the course of their service life. These works must be indicated as obligatory in the technical audit of the building;
- ✓ renovation of the common areas of multifamily residential buildings (repair of roofs/facades, repainting of staircases, etc.);
- ✓ implementation of energy efficiency measures indicated as obligatory for the building in the energy audit reports:

  Envelope:

  - replacement of joinery (windows, doors, displays, etc.);
  - thermal insulation of envelope components (external walls, roofs, floors, etc.).

  Microclimate control systems:

  - overhaul, modernisation or replacement of local heat sources/boiler units or their adjoining facilities belonging to the condominium building, including fuel conversion where this is shown to have energy-saving and environmental impacts;
  - installation of systems that use energy from renewable sources to cover the energy demand of the building;
  - rehabilitation or replacement of components of the heating, cooling and air conditioning systems in the building with a view to improving energy efficiency;

- reconstruction of vertical heat distribution systems into horizontal systems to enable individual metering of the heat used by each residential unit in the condominium building;
- rehabilitation or replacement of electrical installations in the common areas of the building and installation of energy saving lighting fixtures in common areas;
- installation of centralised systems for automatic control of the heat supplied from local heat sources owned by the condominium building;
- installation of centralised systems for automatic control of the lighting in the common areas of residential buildings;
- gasification of buildings (installation of gas-fired boiler and connection to an urban gas distribution network where available);
- measures to improve the energy efficiency of lifts;

✓ additional construction and installation works related to the implementation of energy efficiency measures and the respective restoration of common building structures, as a result of the energy saving measures applied. The additional construction and installation works are related only to the restoration of the original condition, damaged as a result of the renovation of common areas and during the replacement of joinery in the individual units.

Eligible for funding under the Programme is the most cost-effective package of energy saving measures for the building, which achieves energy consumption Class C in accordance with Regulation No 7 of 2004 on the energy efficiency of buildings.

4.10 Other energy efficiency financing schemes

The scale of EU level investments required to achieve 20 % increase of energy efficiency by 2020 is estimated at around EUR 100 billion per year. To achieve this goal, the EU has increased the amount of public funds for energy efficiency. In parallel, appropriate financing mechanisms are being used to leverage private investments so that the required financial resources can be secured. Initiatives which support energy efficiency investments at EU level are outlined in the next paragraphs:

European Fund for Strategic Investments (EFSI)

The EFSI is a new tool for the mobilisation of strategic private investments where the market alone fails to do so. The Fund provides financing for infrastructure and innovation projects, and also provides risk finance for SMEs. The objective is to maximise the impact of public spending by leveraging additional financial resources and unlocking private investments. The Fund finances key development areas: (1) infrastructure (transport, energy, digital, environmental, urban and social); (2) education and training, healthcare, research and development, information and communication technologies, innovation; (3) renewable energy and energy efficiency; (4) support for SMEs and intermediate companies.

The Fund resides with the EIB, a strategic partner of the European Commission. Bulgaria has already implemented initiatives through the Fund.

International financial institutions

International financial institutions, including the ones most active on the territory of Bulgaria, namely the EBRD, the EIB and the World Bank, are instrumental to the development of sustainable financial mechanisms aimed at improving energy efficiency. In particular, they:

- ✓ support actively local banks and institutions in designing energy efficiency financing schemes;
- ✓ provide long-term financing and technical assistance for their clients in an integrated way.

4.11 Policies and measures to support the implementation of the National long-term programme

After studying different sources and materials of various organisations and institutions, a sample list of policy and measure options was created, which reflects their applicability in Bulgaria in six categories.

Table 4.11-1: Strategic polices and measures and their applicability in Bulgaria

Policy	***Application***
Ensure support for overall renovation of the building stock across the entire spectrum of policies.	The support will help create an environment which provides certainty and market confidence over a longer period of time.
Undertake a systematic evaluation of the barriers to improvement in each market segment and develop policies to address these barriers.	Identification of major obstacles and potential solutions.
Address energy poverty by improving the energy efficiency of the building stock.	Improving the energy performance of multifamily residential buildings will help improve the living standards of vast groups of the population of the country. The large-scale renovation of multifamily residential buildings which is now on-going under the National programme for the improvement of energy efficiency of multifamily residential buildings will continue by an update of the Programme whereby the grant percentage is reduced and various sources and

Policy	*Application*
	financing mechanisms are included.
Setup a broad group of stakeholders as a forum for consultations, policy making and feedback on practical matters and barriers to renovation.	The stakeholders identified in this document could form the basis for setting up a stakeholder forum.
Demonstrate leadership by accelerating the comprehensive renovation of public buildings, thereby increasing the awareness and capacity so that it can be applied later in private commercial renovation initiatives.	In addition to the requirement for renovation of 3 % (Article 5 of Directive 2012/27/EU) and with a view to supporting the achievement of the national energy efficiency target in all State-owned heated/cooled buildings used by the state administration, Bulgaria has committed to take measures each year to improve the energy performance of at least 5 % of the overall GFA (Article 23 of the ZEE).

Table 4.11-2: Legislative and regulatory policies and measures and their applicability in Bulgaria

Policy	*Application*
Identify potential accelerating factors and develop appropriate regulations which can contribute to improving the energy performance of buildings.	Improvement of the legal framework: Condominium building management policies (Condominium Management Act, ZUES), including incentives for entrusting building management to legal entities, strengthening the requirements to owners of vacant apartments, introduction of penalties for owners who fail to comply with decisions of the general meetings, etc. Social assistance policies: introduction of measures to encourage participation of low-income owners in renovation programmes (through the heating allowances mechanism), etc. Encourage the implementation of local policies supporting the renovation of multifamily residential buildings. Provide more flexible opportunities to support the implementation of building renovation programmes.
Raise the level of energy efficiency requirements in order to encourage comprehensive renovation.	Should be treated as a priority after 2018.
Reassess certain restrictive practices which affect the local deployment of low or zero carbon technology with a view to guarantee the creation of a favourable environment for buildings with integrated renewable sources.	Integrated renewable sources will be supported actively within the EU State aid rules.

Table 4.11-3: Technical polices and measures and their applicability in Bulgaria

Policy	***Application***
Assess the potential of centralised heating systems as systems for provision of efficient low carbon energy.	Take measures to improve efficiency and public approval in view of the scale of the issue and in order to counter the massive withdrawal of consumers. Introduce specific support measures through the National programme for the energy efficiency of multifamily residential buildings.
Ensure appropriate monitoring of and compliance with construction standards.	In accordance with the requirements of the Directive on the energy performance of buildings.
Develop solution packages easily applicable in similar types of buildings.	Create a database of technical solutions to serve as a basis for future projects/investments. Consider the possibility for the local authorities to prepare model designs for buildings constructed by industrial methods, based on the example of Sofia Municipality.

Table 4.11-4: Financial police and measures and their applicability in Bulgaria

Policy	***Application***
Provide financing sources, including international financing sources, together with effective mechanisms that effectively attract private capital.	Consider the possibility for optimisation by distribution of funding from national and international financing sources.
Develop a range of financing mechanisms and arrangements tailored to individual market segments and providing a simplified (One Stop Shop) and commercially attractive source of funding for comprehensive renovation.	There is a major need for the creation of a financial mechanism which supports the renovation of multifamily residential buildings by providing a combination of grants, simplified borrowing and support targeting financially disadvantaged owners.
Develop mechanisms to encourage comprehensive renovation through financing provided by third parties such as ESCO.	Review and where appropriate improve the legal framework to ensure efficient market functioning of ESCO contracts for energy efficiency in the public sector.
Consider the introduction of an incentive mechanism (such as preferential tax treatment of energy-efficient buildings and imposing sanctions to low-efficiency buildings).	Bulgarian law to afford tax preferences for buildings in which energy saving measures have been applied.

Table 4.11-5: Information, communication and capacity building polices/measures and their applicability in Bulgaria

Policy	***Application***
Set up a public database of energy performance of renovated buildings, containing information on how to	Insight of various renovation solutions will encourage the reuse of these solutions.

Policy	*Application*
realise comprehensive renovations.	
Accelerate the introduction of training programmes targeting key professions and vocations.	Link school and university curricula to current trends and practices in the area of energy efficiency.
Create knowledge/experience sharing networks among regions/Member States.	Understanding how other Member States address specific issues may help address similar issues in Bulgaria.
Promote the clustering of related manufacturing processes to maximise macroeconomic benefits and minimise inherent CO_2 emissions.	Increase enterprise awareness with regard to existing financial opportunities.
Develop and disseminate information and advertising activities to sensitise building owners by making them aware of the opportunities for comprehensive renovation.	The success of any policy depends on the effective involvement of owners of the two major types of buildings, residential and non-residential. Conduct of information and communication events is a horizontal objective and a permanent activity in all national initiatives.

Table 4.11-6: Polices and measures related to research and development and their applicability in Bulgaria

Policy	*Application*
Support R&D activities, develop and implement projects demonstrating the application of new or improved technology for comprehensive renovation, including multiplication of the best practices.	Review on a regular basis existing R&D initiatives in the EU and consider options for their application in Bulgaria. Bulgaria's participation in EU's Horizon 2020 programme should be promoted.

The next table complements the overview of individual policies/measures and their applicability in Bulgarian circumstances by outlining specific issues and measures to address them:

Table 4.11-7: Specific issues and measures to address them

Issue	***Measure***
Lack of sufficient statistical information from verifiable sources on the building stock.	Fill the blanks in the national database and create a sustainable system for collection of data on the existing building stock across the various categories of buildings.
Mixed social profiles of occupants of multifamily buildings, including households affected by energy poverty and unable to contribute to the funding of energy saving measures in the building.	Strengthen support polices and measures targeting households affected by energy poverty: - extend the support so as to include low-income individuals and households; - design support mechanisms (based on national and local sources) targeting household contribution to building renovation projects.
A need to optimise and accelerate the implementation of energy efficiency programmes in the residential sector.	Intermediate and ex-post assessments of existing energy efficiency programmes in the residential sector to help identify and dismantle barriers. Survey on how apartment owners in condominium buildings perceive the programmes.
The lack of traditions and experience in the management of condominium buildings is a major challenge to creating appropriate organisation for energy-efficient renovation of entire multifamily buildings. Bad practices, including uncontrolled and inefficient partial interventions in building envelopes, have become widespread over the years. These created firm and persistent misconceptions which undermine efforts to deploy a large-scale renovation process aimed at the improvement of energy efficiency in multifamily residential buildings.	Improve the legal framework (ZUES) on the basis of the lessons learned from the implementation of existing energy efficiency programmes and schemes. Raise public awareness in regard to: - the obligations of the owners of apartments in condominium buildings; - the benefits of comprehensive renovation of buildings, as opposed to partially applied measures.

4.12 From grants to financial mechanisms for the financing of energy efficiency in the residential sector

Grants schemes are often the only means to demonstrate impacts and undeniable results, and build a critical mass so that the process can continue on borrowed funding. The latter is inevitable due to the widely recognised downsides of grant financing, and namely:

- such financing is insufficient (because public budgets have their limitations);
- the measures applied are often only part of all measures that can be applied to achieve maximum impact;
- grants are provided post-factum in reimbursement of the expenditure made, and owners therefore need to pay the expenses upfront, which is unfeasible for many of them.

This puts forward innovative revolving solutions which come to displace grant schemes. The main advantages of the new financing schemes are:

- ✓ the same funds can be reused multiple times and still remain property of the State;
- ✓ loans are widely used for property acquisition or renovation in the housing sector;
- ✓ these mechanisms are more easily manageable by the government administration.

European experience has now demonstrated that the most successful mechanisms are based on an integrated approach which combines three components: (1) ensuring simplified access to borrowing, (2) grants and (3) financial aid targeting low-income households.

Loans are typically provided for a long term (up to 20 years), under low interest rates (3 % or less), and are intended for full (comprehensive) renovation, because:

- comprehensive renovation is expensive;
- this is the only kind of renovation capable to generate sufficient savings, which in turn ensure the feasibility of business plans than would convince banks and financial institutions to approve the loans;
- results are long-term and thus justify longer repayment periods. Consequently, the monthly instalments due by the owners of residential units would be low, meaning that these loans will be affordable for the majority of households.

According to usual practice in Member States, loans are provided to the Associations of Owners. A common problem is that AOs do not possess assets which can secure the loan; however, this problem can be addressed by solutions in various combinations: a State guarantee is usually provided, which does not exempt AOs from the obligation to provide general security to the financing institution for risk sharing purposes.

Loan schemes typically take into account the average financial standing of potential borrowers. Financing mechanisms should also recognise the fact that the social and financial status of individual apartment owners in a condominium building can be very diverse. Several approaches can be used to address the issue of low-income households that cannot afford any form of investment in renovation:

- percentage-based grants, according to income levels;
- providing financial aid specifically intended to support the participation of financially disadvantaged owners;
- the monthly instalments due by financially disadvantaged owners can be paid by the State or local authorities.

The structural funds support renovation by grant schemes or lending mechanisms, or by combinations of the two. The combination of both types of financing – grants and borrowing, becomes necessary because public resources are limited and cannot meet the needs for investment in energy efficient renovations only by the provision of grants. On the other hand, without support from grant schemes, loans alone cannot help overcome the financial difficulties of many of the owners in a residential building, or the long period for repayment of investments in energy saving measures when applied as a full package and simultaneously.

In Bulgaria, large-scale renovation of multifamily residential buildings is just starting, which is why the approach undertaken was for the owners to be supported by 100 % grant financing until the allocated EU and national resources are used up. Renovation of a critical mass of buildings across all cities and municipalities in the country is expected to raise citizens' awareness with regard to the benefits brought about by energy efficiency renovations, and reverse owners' attitudes and resistances. This will increase interest and motivation to invest in the comprehensive renovation of residential buildings.

In the meantime, efforts will be made to dismantle barriers and create a sustainable financial mechanism by combining grant financing with simplified access to borrowing for energy-efficient renovation of multifamily residential buildings.

The National programme for the energy efficiency of multifamily residential buildings is an example of this approach. Essentially the Programme is the first phase of the launching of a broader process of residential buildings renovation. The Programme started with a 100 % grant component in 2015 and 2016. The next phase of the implementation of energy efficiency measures in the residential sector is to develop the Programme along the lines of combining a portion of the grant component with simplified access to borrowing at low interest rates (approximately 3–4 %). Part of the next phase of the Programme is the creation of a financial mechanism for provision of low-interest loans that are secured by State guarantees.

The grant component of the Programme will be reduced stepwise until 2020 to 75 %, 50 % and 25 %. This approach should include a social mechanism for financially disadvantaged owners in the same residential building, who should be eligible for 100 % or 90 % grants on the basis of specified social criteria.

It should be noted that the combined approach was applied already in the programming period 2007–2013 under certain schemes of Operational Programme 'Development of the Competitiveness of the Bulgarian Economy' and Operational Programme 'Regional Development' (although not exclusively in the area of energy efficiency improvement of the building stock). This means that a certain level of capacity exists in Bulgaria – both on the part of the authorities which manage public funds (including from the European Structural and Investment Funds) and on the part of financial intermediaries (banks and financial institutions that provide the financial resources).

Such approach with reduction of the grant percentage should be combined with stepwise introduction of appropriate tax preferences/incentives such as low-interest loans whereby money is given upfront to owners/AOs and repaid in accordance with an agreed repayment plan, and in combination with guarantees which provide assurance to the lenders (banks) that they will receive back all or part of their capital in case a borrower defaults on their obligations.

Table 4.12-1: Benefits of grant schemes for the various stakeholders

Stakeholder	***Benefit***
The State	Pursue the objectives of the programme, namely reduction of greenhouse gas emissions, by increasing financial supply
	Reuse of the money repaid
	Combine grants with financial mechanisms
	Encourage co-investment by public and private sectors, thereby increasing the resources available for reduction of greenhouse gas emissions
	Support market-based supply of funds for the purpose of GHG reduction by means of capacity building across financial intermediaries (banks) and by securing additional capital
Banks	Diversify/expand product portfolios and activities
	Access to consultancy services for personnel training on how to market the new products
	Share risks with the public sector
	The additional resources support the development of products for new markets or for entering previously unfeasible markets
Associations of owners/ owners	Access to preferential financing, which was previously not available
	Obtain funding from local banks under procedures more simple than those for standard bank loans
	The loans obtained are in combination with consultation and advice
	Repayment instalments are made affordable owing to the long-term of the loan

4.4 Key aspects of long-term development by 2050

In the long term, for the period 2020–2050, Bulgaria will investigate and identify mechanisms which ensure the achievement of the energy efficiency targets for the building stock, set at EU and national level by 2050 and with an interim deadline by 2020.

This will be supported by activities and specific steps for analysis, assessment and structuring of effective financing mechanisms which encourage the private sector and homeowners to invest their own resources rather than rely on grant schemes.

These mechanisms should be based on a specific assessment which includes at least the existing regulatory requirements (in so far as standards for the next period 2020–2050 are not available at present):

- ✓ the most appropriate forms for application of financial tools;
- ✓ identification of market inefficiencies or suboptimal investment situations;
- ✓ determining the expected level and scope of the public investments required;

- ✓ defining the estimated rate of private co-financing of energy efficiency measures, where they are combined with grant schemes;
- ✓ options for preferential rewards to private or public investors operating under market economy conditions;
- ✓ establishing availability or lack of 'State aid' in accordance with the applicable EU and national laws, and in case of availability, State aid should be limited to the minimum amount necessary to compensate the lack of private capital, taking into consideration market inefficiencies or suboptimal investment situations.

Additional mechanisms to encourage private investment and transition from grant schemes to other financing arrangements may include a series of tools and policies designed to change behaviours by means of fiscal incentives. Any introduction of fiscal stimuli should be based on an analysis and assessment by the Ministry of Finance of the implications of these stimuli on revenue streams to the national budget. In the longer term, efforts will be made to create a mechanism for structuring and designing specific fiscal incentives or combinations thereof, which encourage the private sector to invest own funds in improving the energy efficiency of the building stock.

All competent institutions will also contribute to the planning of sustainable mechanisms for encouragement of private investment, in accordance with their respective functions — relevant government institutions, managing authorities of operational programmes which support energy efficiency measures, and local authorities.

In the longer term, for the period 2020–2050, identification of additional mechanisms to attract private investment in energy efficiency will be supported by the identification and assessment of practices existing in EU Member States. This will be based on an analysis of the applicability of each practice in the Republic of Bulgaria to obtain assurance that if a mechanism is efficient and achieves results in another Member State, the same or similar mechanism will be equally successful when applied in Bulgaria. The introduction of any mechanism will require the commitment of technical, human and financial resources and the costs of these resources should not exceed the benefits/savings achieved thereby. In this regard, the State should ensure the applicability of a particular practise based on an ex-ante assessment.

The introduction of social policies as a mechanism to support financially disadvantaged owners will also form a part of the long-term targets of the country. In collaboration with the national institutions responsible for social policies, an analysis will be made of the options to support the comprehensive renovation of condominium buildings in which financially disadvantaged apartment owners are present. This will also include an estimation of the level and impact of the public resources that Bulgaria will invest, both in regard to the development of the specific support schemes and the implications for the national budget considering the savings expected.

5. ESTIMATING THE EXPECTED ENERGY SAVINGS

5.1 Direct benefits: energy-saving and environmental impacts

Summaries of the results under the various scenarios by 2020 for the State-owned buildings are given in Table 5.1-1, for municipal buildings – in Table 5.1-2 and in Table 5.1-3 are shown the results for residential buildings. The share of the savings projected for State-owned and municipal buildings is determined in accordance with the national target, excluding the obligated parties referred to in Article 14(4) of the ZEE, while the share for residential buildings is determined on the basis of the overall national target.

Table 5.1-1: Projected savings under each scenario by 2020, State-owned buildings

Indicative scenario	CUMULATIVE RESULTS BY 2020					
			Savings (FEC and emissions)			
	Renovated GFA, m^2	Investments, BGN	ktoe	GWh	National target share, %	t CO_2
Scenario A1	526 904	79 035 547	12.77	148.54	5.55%	18 039.83
Scenario A2	582 294	87 344 040	13.61	158.22	5.92%	19 215.69
Scenario B1	953 820	143 073 031	24.01	279.19	10.44%	33 907.31
Scenario B2	1 164 587	174 688 079	27.21	316.45	11.83%	38 431.38
Scenario C1	708 795	106 319 229	17.44	202.83	7.58%	24 632.93
Scenario C2	815 211	122 281 655	19.05	221.51	8.28%	26 901.96

Table 5.1-2: Projected savings under each scenario by 2020, municipal buildings

Indicative scenario	CUMULATIVE RESULTS BY 2020					
			Savings (FEC and emissions)			
	Renovated GFA, m^2	Investments, BGN	ktoe	GWh	National target share, %	t CO_2
Scenario A1	1 208 340	181 250 927	29.30	340.65	12.74%	41 370.45
Scenario A2	1 335 364	200 304 657	31.20	362.85	13.57%	44 067.02
Scenario B1	2 187 380	328 107 040	55.06	640.27	23.94%	77 759.07
Scenario B2	2 670 729	400 609 314	62.41	725.70	27.13%	88 134.05
Scenario C1	1 625 468	243 820 147	40.00	465.14	17.39%	56 490.29
Scenario C2	1 869 510	280 426 520	43.69	507.99	18.99%	61 693.83

Table 5.1-3: Projected savings under each scenario by 2020, residential buildings

Indicative scenario	CUMULATIVE RESULTS BY 2020					
			Savings (FEC and emissions)			
	Renovated GFA, m^2	Investments, BGN	ktoe	GWh	National target share, %	t CO_2
Scenario A1	8 040 397	1 206 059 617	230.32	2 678.20	32.17%	311 673.63
Scenario A2	11 643 262	1 746 489 225	283.94	3 301.65	39.66%	384 227.63
Scenario B1	16 948 746	2 542 311 888	417.87	4 859.04	58.36%	565 467.36
Scenario B2	17 464 892	2 619 733 838	425.91	4 952.48	59.48%	576 341.44
Scenario C1	27 688 679	4 153 301 807	687.70	7 996.61	96.05%	930 599.08
Scenario C2	29 108 154	4 366 223 063	709.85	8 254.14	99.14%	960 569.07

On the basis of the analysis made, the scenario to be implemented in the 2016–2020 period is Scenario A2 which will contribute to the national energy savings target by 39.66 %.

5.2 Other indirect benefits

Implementation of the National long-term programme for the promotion of investments in measures aimed at improving the energy performance of the national stock of public and private residential and commercial buildings will contribute to:

- raising citizens' social status and quality of life;
- increasing public trust in institutions;
- improving the regulatory framework;
- improving the investment climate;
- development of technologies and of the free market for goods and services;
- job creation;
- strengthening the administrative capacity of the administration and improving the interoperability of the functions and responsibilities exercised by the institutions involved;
- improving Bulgaria's image in the EU as a reliable partner in the implementation of the Union's sustainable development policies.