



REPUBLIC OF BULGARIA

Ministry of Energy

**NATIONAL PLAN**  
**FOR THE IMPROVEMENT OF THE ENERGY PERFORMANCE OF HEATED AND/OR**  
**COOLED STATE-OWNED BUILDINGS USED BY THE STATE ADMINISTRATION**  
**2016–2020**

Sofia, May 2017

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## ACRONYMS

AUER	Sustainable Energy Development Agency
VAT	Value Added Tax
EU	European Union
ESCO	Energy service companies
ZEE	Energy Efficiency Act
ME	Ministry of Energy
MRRB	Ministry of Regional Development and Public Works
NPDEE	National energy efficiency action plan
NSI	National Statistical Institute
OPRG	Operational Programme 'Regions in Growth' 2014–2020
GFA	Gross floor area
NZEBs	Nearly-zero energy buildings

*The National plan for the improvement of the energy performance of heated and/or cooled state-owned buildings used by the State administration is developed by a team of scientists at the Technical University of Sofia under a contract awarded by the institution responsible for the development of the plan, the Ministry of Regional Development and Public Works. The various scenarios developed by the 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**

The National plan for the improvement of the energy performance of heated and/or cooled state-owned buildings used by the State administration has been developed on the basis of Article 5(3)(3) of the Energy Efficiency Act (ZEE).

In accordance with § 19 of the Transitional and Final Provisions of the ZEE, the Plan is to be submitted to the European Commission as part of the plans referred to in Article 5(3)(1) ZEE and updated every three years after 30 April 2014.

## **1. OVERVIEW OF THE NATIONAL STOCK OF STATE-OWNED BUILDINGS USED BY THE STATE ADMINISTRATION**

### **1.1 Legal framework at EU level**

Pursuant to Directive 2010/31/EU (EPBD) on the energy performance of buildings and Directive 2012/27/EU on energy efficiency, public bodies at national, regional and local level should lead by example in the area of energy efficiency. This EU requirement is based on the need to reduce primary energy consumption in buildings, because this effort has a long-term effect and is an important driver for achieving compliance with the obligations arising from Community law, i.e. *'buildings owned by public authorities account for a considerable share of the building stock and have high visibility in public life'*.

The exemplary role of buildings owned by public bodies and the obligation for their major renovation at least to the minimum energy performance standards are set in Article 5 of Directive 2012/27/EU. The obligation is complimentary to the obligations laid down in Directive 2010/31/EU and its application at Member State level is without prejudice to Article 7 of 2010/31/EU, according to which *'Member States shall take the necessary measures to ensure that when buildings undergo major renovation, the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance requirements in so far as this is technically, functionally and economically feasible'*.

At EU level, the appropriate annual rate of renovation of heated or cooled buildings owned by public bodies is 3 % of the gross floor area of the buildings owned and occupied by the central government in each Member State as from 1 January 2014.

### **1.2 The national legal framework of the Plan in the context of EU energy efficiency requirements**

Directive 2010/31/EU uses the terms *'public sector'* and *'public bodies'* in a broad context. These terms extend to buildings occupied by public bodies and buildings frequently visited by the public, such as shops and shopping centres, supermarkets, restaurants, theatres, banks and hotels. According to the EPBD, the public sector in each Member State should lead the way in the field of energy performance of buildings, and therefore the national plans should set more ambitious targets for the buildings occupied by public bodies. The national plans should also include measures to support public bodies undertake energy efficiency improvements. Furthermore, buildings occupied by public bodies should undergo certification on a regular basis and dissemination to the public of information on energy performance should be enhanced by clearly displaying these energy performance certificates at prominent places.

All public buildings encompassed by the definition in Regulation No 1 on the nomenclature of buildings and structures in Bulgaria, including their respective subcategories, should be regarded as Bulgarian counterparts of the broad concepts used in the EPBD. Directive 2012/27/EU introduces an additional requirement for renovating each year 3 % of the GFA of the building stock owned by central governments, i.e. the three per cent requirement applies to buildings owned and occupied by institutions at central government level, but can also apply to administrative institutions at lower government levels.

The two directives have been transposed Bulgarian legislation to align it with Union law. The directives are binding in terms of the result to be achieved, leaving it to Member States to select approaches and methods

appropriate for achieving the result. Bulgaria has set a more ambitious target for the renovation of buildings owned and occupied by central government as Article 23(1) ZEE provides that every year 5 % of the GFA of all heated and/or cooled State-owned buildings used by the State administration should undergo measures to improve their energy performance.

The measure will support the achievement of Bulgaria's 2020 national energy efficiency target and extends to all central government buildings as well as to part of the buildings occupied by provincial governments in which regional branches of central administrations are accommodated. The group under consideration also includes buildings owned or occupied by various arms of the central government such as state agencies, state commissions or executive agencies.

Article 2(6) of the Administration Act (ZA) requires the administration to plan its work and operate so as to achieve high outcomes for the public while using its resources in the most efficient way possible. In the context of this provision, energy is part of these resources, and is to be used in accordance with the requirements for resource-efficiency, responsibility, accountability and efficacy. This, in combination with the requirement to serve as an example for other buildings, means that central government buildings are subgroup with a special focus on the implementation of energy efficiency policies.

Another relevant term in this context is 'institution' as defined in the Additional Provisions of the State Property Act: *'Institutions are the Parliament, the administration of the Bulgarian President, the Constitutional Court, the Council of Ministers, the ministries and other budget-funded State bodies or organisations with a mandate to manage State property'*.

Furthermore, Article 12(1) provides that the State's energy efficiency policy is implemented by all State and local bodies. The key responsibilities of State bodies for the implementation of the State's energy efficiency policy are presented in Figure 1.2-1:

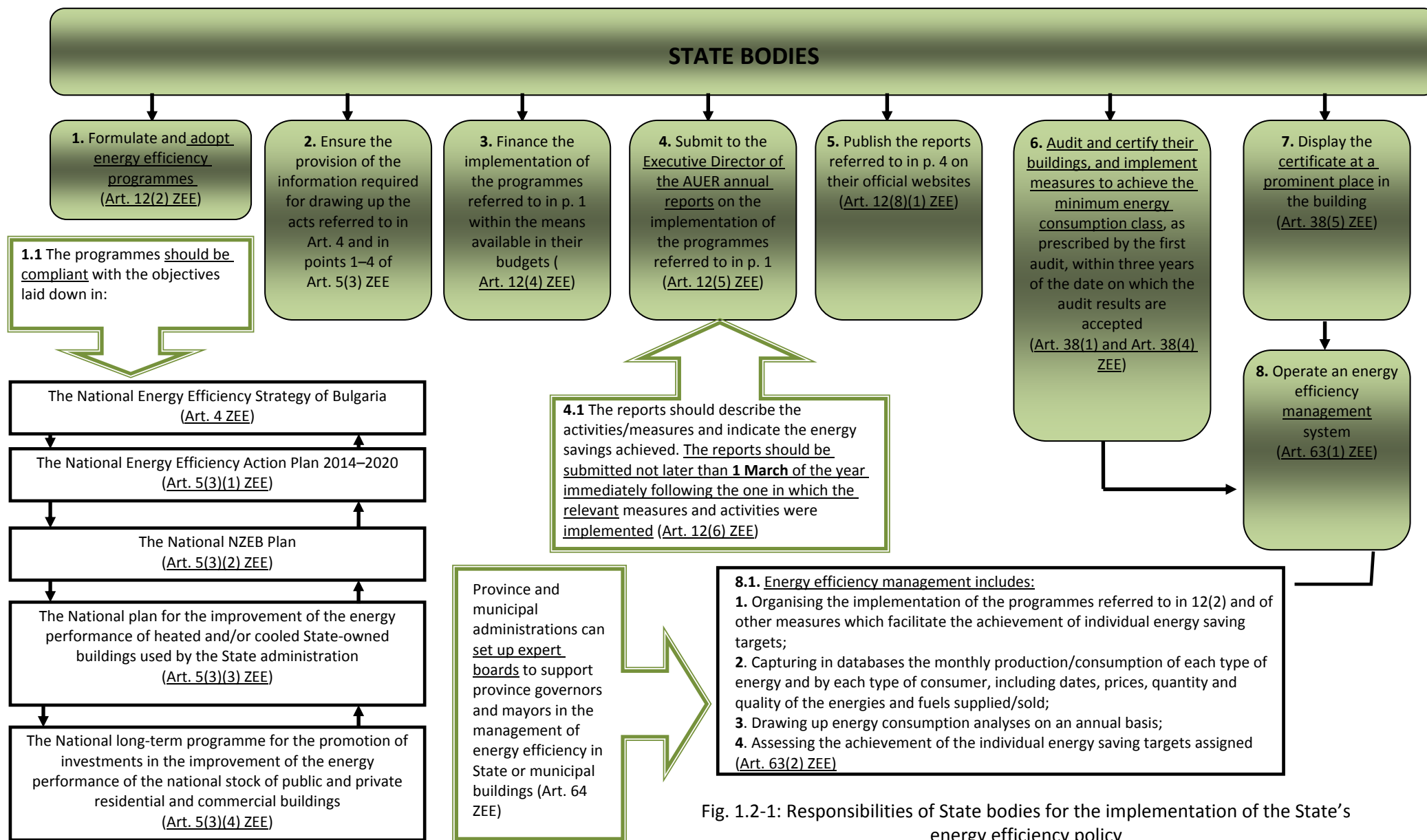


Fig. 1.2-1: Responsibilities of State bodies for the implementation of the State's energy efficiency policy



For the purposes of the implementation of the present Plan, important additional information about buildings owned by the State administration will be the information which province governors are required to submit by 31 March each year to the MRRB in accordance with Article 82(1) of the State Property Act. This information includes copies of all new deeds of state property (ADS) and or ADS amendments as well as details of the management and of any disposal of State properties in the respective province in the previous year. With effect from 26 July 2013, all ministers or heads of other institutions which have approved acts on the grounds of Article 70(2) of the State Property Act are required to submit to the MRRB by 31 March each year all new ADS or ADS amendments issued in the previous year in respect of State-owned properties managed by them.

### 1.3 The national stock of State-owned buildings owned or occupied by central government

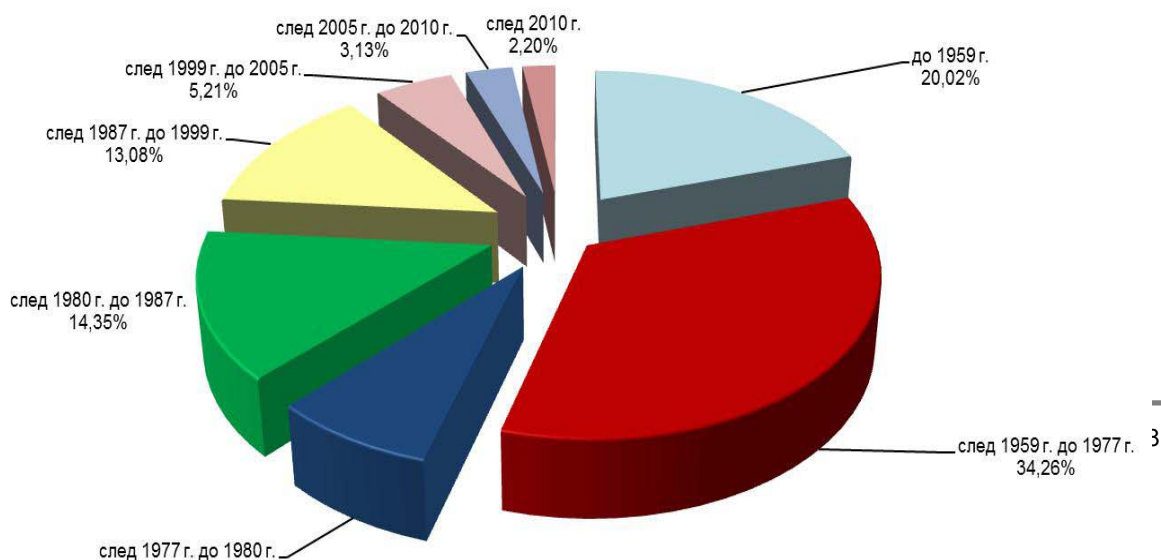
An AUER database of 9 555 entries containing essential technical parameters of buildings owned by the State or municipalities was used to collect reliable information on the buildings to be included in major renovation plans.

The buildings owned or used by central government were identified by a systematic analysis of the set comprised of State-owned buildings.

In the period 1974–1986, administrative buildings in Bulgaria were designed in accordance with the rules applicable at that time, i.e. ‘Temporary standards and requirements for designing administrative buildings’, which were published in Bulletin of Construction and Architecture, issues 3–4 of 1975 and were also printed as a separate booklet in 1974. ‘Standards for the design of administrative buildings’ entered into force on 1 January 1982.

It is important to note that these standards did not apply to very large administrative buildings, which at that time were the monumental edifices of the Council of State, the Council of Ministers, the Parliament, the headquarters of political parties, the Ministry of Interior, the Ministry of Defence, the Building Corps of the Armed Forces and other militarised institutions, the House of Customs, the State Archive, data centres, buildings of telecommunication operators, research and development institutions, institutes of designers and planners, and industrial buildings.

The analysis demonstrates that 34.26 % of the existing administrative buildings were built and put into service in 1959–1977, i.e. they were designed to the oldest building standards of 1959, while the remaining 65.74 % were designed and built to the standards applicable in 1974–1986. Very few buildings occupied by central government, 3.13 %, were designed and built in 2005–2010, a period during which Bulgarian law was in a process of harmonisation with the Union’s energy efficiency legislation.



*Figure 1.3-1: Distribution of central government buildings<sup>1</sup> by period of putting into service*

*Key*

Before 1959	20.02%	1987–1999	13.08%
1959–1977	34.26%	1999–2005	5.21%
1977–1980	7.75%	2005–2010	3.13%
1980–1987	14.35%	After 2010	2.20%

A historical review of the technical requirements to building designs over the past decades helps capture information which can be used for outlining the geometric profile of a typical administrative building in that period.

For the purposes of this Plan, a subset of buildings occupied by central government was extracted from the larger set of State-owned buildings (those which appear in AUER's database).

Thus, the analysis of the available database revealed that the largest proportion of buildings in which energy saving measures (ESM) are not implemented yet (non-ESM buildings) are those with GFA from 1 000 to 5 000 m<sup>2</sup> (37.6 %) followed by the 5 000–10 000 m<sup>2</sup> group and then by those with GFA above 10 000 m<sup>2</sup>. Figure 1.3-2 presents the distribution of non-ESM buildings by GFA.

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<sup>1</sup> *The assessment is based on 926 buildings.*

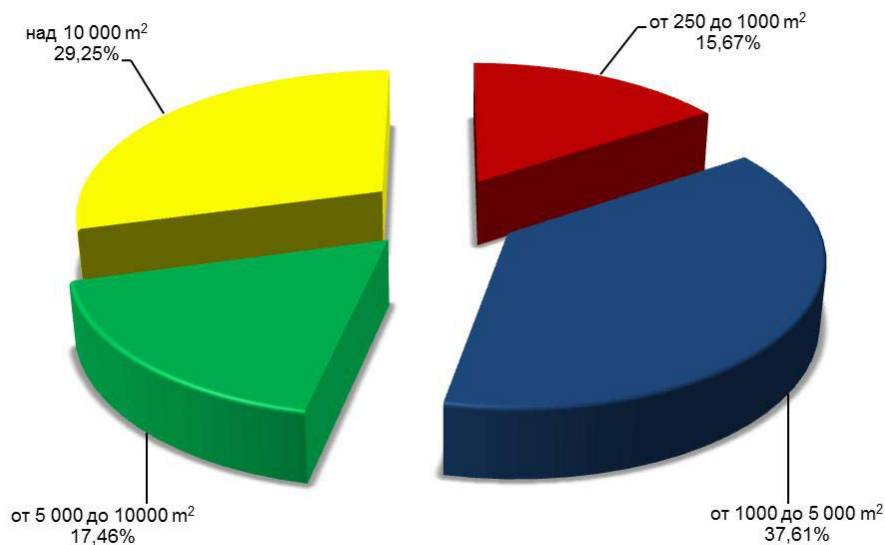


Figure 1.3-2: Distribution of non-ESM buildings by period of putting into service

*Key*

250–1 000 m <sup>2</sup>	15.67 %
1000–5 000 m <sup>2</sup>	37.61 %
5000–10 000 m <sup>2</sup>	17.46 %
Above 10 000 m <sup>2</sup>	29.25 %

In the end of 2016 the buildings with GFA above 1 000 m<sup>2</sup> are due to report on the achievement of their individual energy saving targets in 2008–2016. Having regard to the fact that much of the GFA of the buildings occupied by central government (69.92 %) is not renovated, it can be concluded that the buildings in this GFA bracket may not be able to achieve their individual energy saving targets for the reporting period. This requires a mobilisation of effort across the government administration to bridge the lag.

Table 1.3-1 and Figure 1.3-3 provide high-level GFA data on ministries which are known to have not implemented energy saving measures aimed at achieving the minimum energy efficiency standard.

*Table 1.3-1: Non-ESM buildings<sup>2</sup> occupied by central government*

<b>Ministry/institution</b>	<b>Number of buildings</b>	<b>GFA, m<sup>2</sup></b>
Ministry of Interior	410	822 629
Ministry of Health	22	49 668
Ministry of Agriculture, Food and Forests	21	11 017
Ministry of Economy, Ministry of Energy	7	47 228
Ministry of Environment	19	33 102
Ministry of Justice	101	189 153
Ministry of Regional Development and Public Works	38	34 993
Ministry of Labour and Social Policy	53	26 895
Ministry of Finance	120	159 685
Ministry of Education and Science	15	12 437
Province administrations	42	102 310
<b>TOTAL</b>	<b>848</b>	<b>1 489 117</b>

Table 1.3-1 captures only central government buildings which fall within the scope of the Plan. The details in Table 1.3-1 do not include the GFA of public buildings owned by these institutions but used for other purposes (e.g. State-owned school buildings which are not covered by the Plan are excluded from the properties of the Ministry of Education).

<sup>2</sup> *The list is not complete as the institutions provide their data to the AUER on a voluntary basis. The data are valid as of 1 January 2016.*

## **2. DEFINITION OF ECONOMICALLY VIABLE APPROACHES TO IMPROVE THE ENERGY PERFORMANCE OF BUILDINGS**

A quantitative assessment of energy, environmental and financial indicators reflecting the costs and benefits had to be made before the plan could be developed. The required assessment was obtained by a modelling survey followed by economic analysis (as per the methodological framework provided in Regulation 244/2012/EU) of the following types of reference administrative buildings:

- an administrative building in the GFA < 5 000 m<sup>2</sup> subcategory;
- an administrative building in the GFA 1 000–5 000 m<sup>2</sup> subcategory;
- an administrative building in the GFA > 10 000 m<sup>2</sup> subcategory;
- baseline heat-supply scenarios: district heating, gasoil;
- climate factors: zone 7 (continental climate) and zone 1 (sea climate);
- actual interest rates: 3 %, 4.5 % and 6 %;
- escalation of energy prices: 1 % p.a. and 2 % p.a.;
- escalation of product prices: 0.5 % p.a.

In accordance with the requirements of Directive 2010/31/EU, the baseline scenarios include surveys of packages of energy saving measures in combinations appropriate to the specificity of each building. Table 2-1 presents the main components of the individual energy saving measures used as a basis for developing the scenarios.

Table 2-1: Key features 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	$\eta$	0.93
	C3.2	2	Installation of gas-fired boiler	$\eta$	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 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 carried out by the 'present value of global costs' indicator calculated over a period of 30 years. The sensitivity of the results to real interest rates, product prices escalation and energy prices escalation was tested.

Partial results for a reference building in the GFA < 5 000 m<sup>2</sup> subcategory, which accounts for more 35 % of the overall GFA, are provided in Table 2-2 and Figure 2-1.

Table 2-2: Key parameters used in the economic analysis

<b>Category of building</b>	<b>Administrative</b>		
<b>Conditioned area</b>	1 772 m <sup>2</sup>		
	Climatic zone	Sofia	
<b>Baseline scenario:</b>	Heating	Central	
	Efficiency, %	100	
<b>Financial model (without VAT)</b>			
Real interest rate, %	3.00	4.50	6.00
Price escalation rate, %	0.50	0.50	0.50
Energy price escalation rate, %	1.00	2.00	2.00
Present value of the global costs, BGN/m <sup>2</sup>	219.63	209.57	194.26
Optimal boundaries of primary energy, kWh/m <sup>2</sup>	170.60	170.60	170.60
<b>Macroeconomic model (without VAT)</b>			
Real interest rate, %	3.00	4.50	6.00
Price escalation rate, %	0.50	0.50	0.50
Energy price escalation rate, %	1.00	2.00	2.00
Present value of global costs, BGN/m <sup>2</sup>	314.16	304.10	288.80
Optimal boundaries of primary energy, kWh/m <sup>2</sup>	170.60	170.60	170.60
<b>Present value of global costs for an NZE building, BGN/y</b>	<b>348.77</b>	<b>327.39</b>	<b>304.88</b>
<b>NZEB primary energy demand, kWh/m<sup>2</sup></b>	<b>132.80</b>	<b>132.80</b>	<b>132.80</b>
<b>Difference between NZEB global costs and optimal costs, BGN/m<sup>2</sup></b>	<b>129.15</b>	<b>117.82</b>	<b>110.62</b>

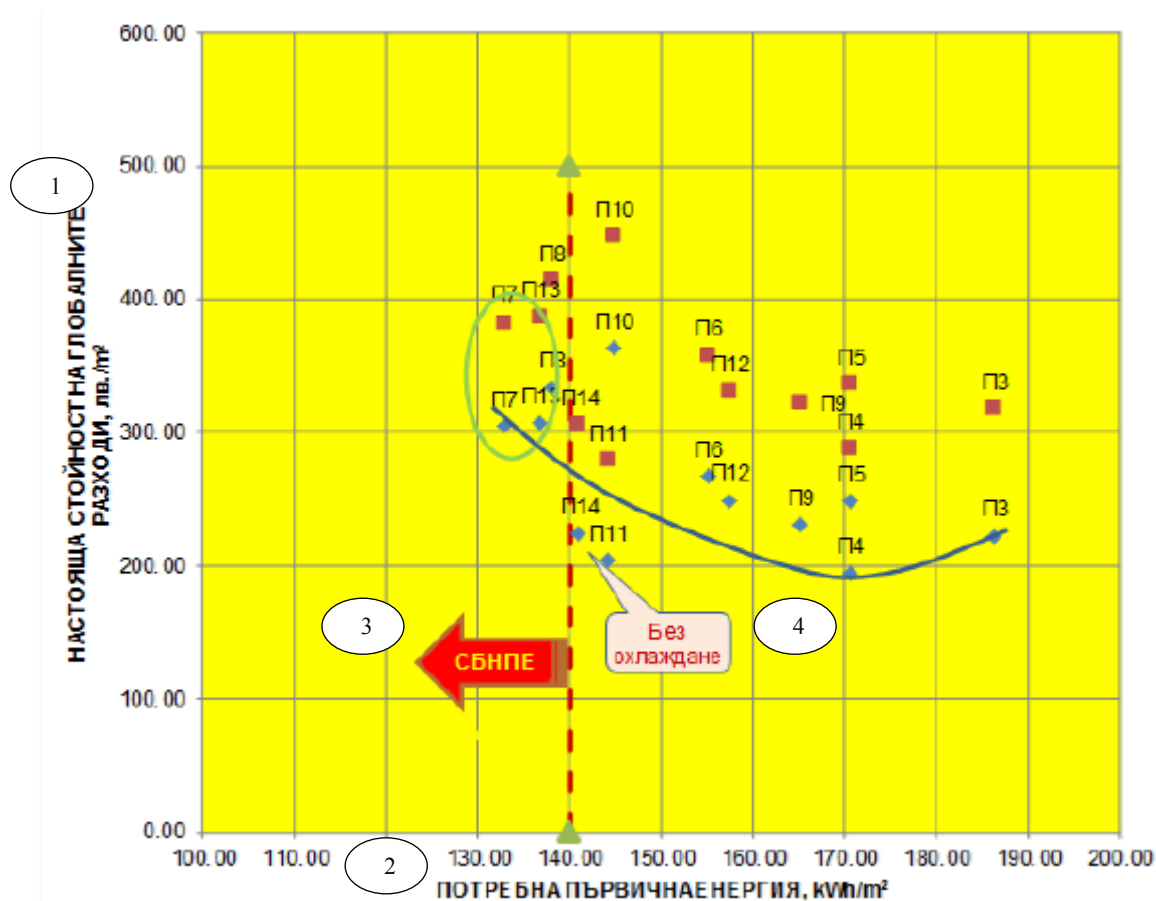


Figure 2-1: Present value of global costs for a reference building with GFA = 1 772 m<sup>2</sup>

Key: 1 – present value of global costs, BGN/m<sup>2</sup>; 2 – primary energy demand, kWh/m<sup>2</sup>; 3 – NZEB; 4 – without cooling; blue line – financial model, red line – macroeconomic model

The estimated energy savings following renovation to energy consumption Class B of existing administrative buildings occupied by central government are reported in Table 2-3.



Table 2-3: Estimated energy savings following renovation of administrative buildings to Class B

Expected energy savings following renovation (according to energy consumption classes)	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	
	kWh/m <sup>2</sup>	kWh/m <sup>2</sup>	kWh/m <sup>2</sup>	kWh/m <sup>2</sup>	primary energy kWh/m <sup>2</sup>
Administrative buildings	340.00	170.85	240.00	120.60	105.50

The simulation survey and the economic analysis were used as inputs in the estimation of the investments (without VAT) required to implement the energy saving measures so that the buildings achieve both the Class B requirements and the environmental performance requirements. These estimates are presented in Table 2-4.

Table 2-4: Required investments in energy saving measures to achieve Class B and resulting CO<sub>2</sub> savings

Category of building	Investments required to achieve Class B requirements, BGN/m <sup>2</sup> GFA	CO <sub>2</sub> emissions saved by a renovated building against the 1999 baseline, kg CO <sub>2</sub> /m <sup>2</sup> GFA
Administrative	120-180	13-17

As Table 1-1 indicates, as of 1 January 2016 the number of non-ESM buildings occupied by central government was 848 with a combined GFA of 1 489 117 m<sup>2</sup>. Six scenarios for the renovation of these buildings were developed.

Two assumptions of the basis on which the renovation can proceed were considered in the scenarios:

- Fixed basis whereby the renovation effort extends to different proportions (5 %, 10 % or 7 %) of all non-ESM GFA as of 1 January 2016, or 1 489 117 m<sup>2</sup>, regardless of how much non-ESM GFA remains in each year. These are scenarios A2, B2 and C2;
- Floating basis whereby the renovation effort extends to different proportions (5 %, 10 % or 7 %) of the non-ESM GFA remaining as of 1 January of the next year. These are scenarios A1, B1 and C1.

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

Table 2-5 indicates how much GFA can be renovated in each scenario over various time spans.

Table 2-5: Potential GFA renovation levels in each scenario and milestone year

Year	2020	2025	2030	2035
SCENARIO A1	22.62 %	40.13 %	53.67 %	64.15 %
SCENARIO A2	25.00 %	50.00 %	75.00 %	100.00 %
SCENARIO B1	40.95 %	65.13 %	79.41 %	87.84 %
SCENARIO B2	50.00 %	100.00 %		
SCENARIO C1	30.43 %	51.60 %	66.33 %	76.58 %
SCENARIO C2	35.00 %	70.00 %	100.00 %	

Among all options and scenarios considered, the most appropriate one is Scenario A2. By 2020 this scenario will lead to the renovation of 25 % of the non-ESM GFA of the buildings occupied by central government, and will achieve compliance with the ZEE requirement for renovating each year 5 % of the GFA of all heated and/or cooled State-owned buildings used by central government.

The other scenarios (except Scenario A1) are more optimistic and can be triggered after a progress review if Scenario A2 does not perform as expected.

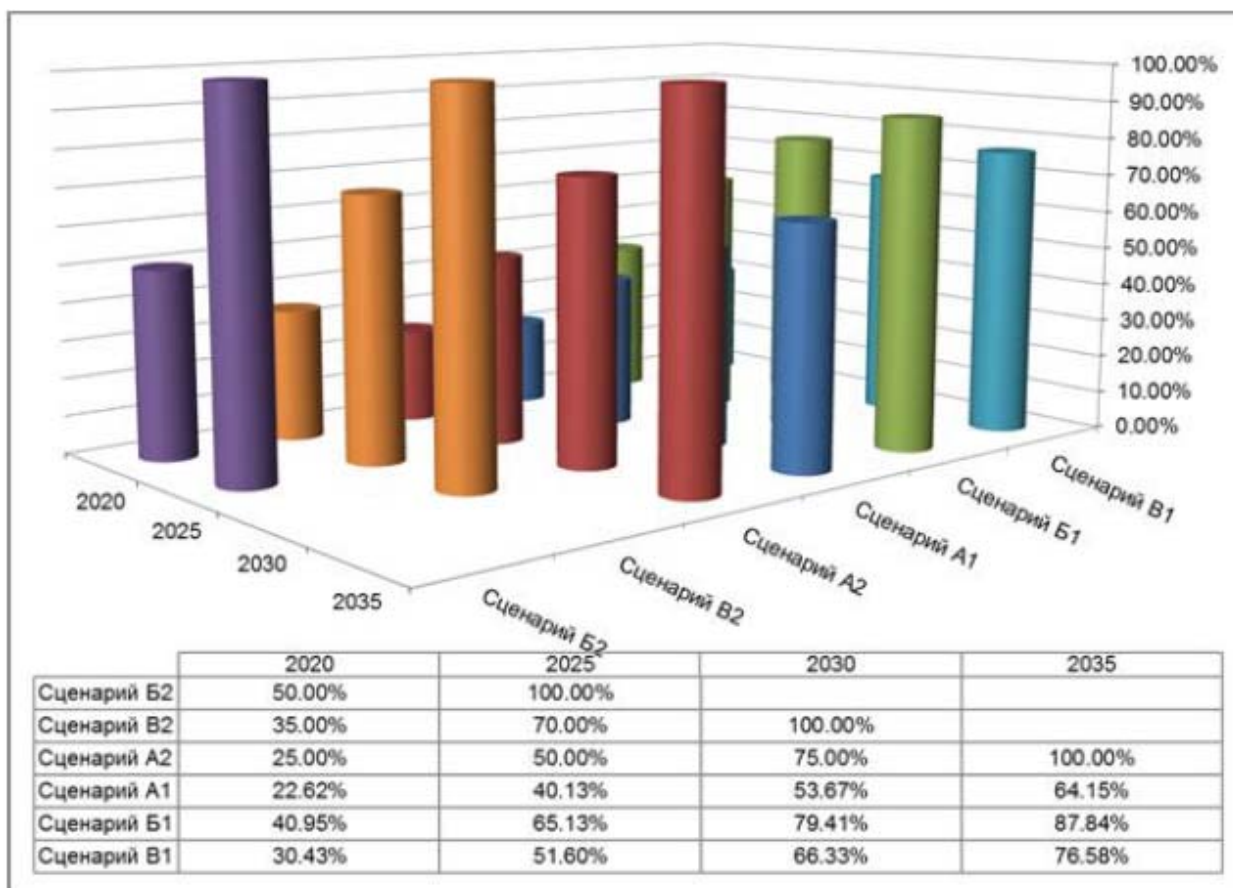


Figure 2-2: Potential GFA renovation levels in each scenario and milestone year

Key First column of table: Scenario B2 / Scenario C2 / Scenario A2 / Scenario A1 / Scenario B1 / Scenario C1  
= x axis of chart left to right

The numbers demonstrate that only three scenarios can achieve 100 % renovation of the building stock occupied by central government until 2035.

Table 2-6 presents detailed results from the six scenarios in the period 2016–2020. The details include renovated GFA, required investments (without VAT), energy savings, and GHG emission reductions.

The scenarios were also applied to each institution which had non-ESM GFA as of 1 January 2016 as indicated in point 1 of this Plan. Table 2-7 presents the numbers for the various ministries, while Table 2-8 summarises the data on the buildings of province administrations.

Table 2-6: Performance achieved in each scenario

SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA						SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016					
Administrative buildings, central government						Administrative buildings, central government					
Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)			Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)		
			ktoe	GWh	t CO <sub>2</sub>				ktoe	GWh	t CO <sub>2</sub>
2016	74 456	11 168 378	0.93	10.85	1 116.84	2016	74 456	11 168 378	0.93	10.85	1 116.84
2017	70 733	10 609 959	0.89	10.31	1 061.00	2017	74 456	11 168 378	0.93	10.85	1 116.84
2013	67 196	10 079 461	0.84	9.79	1 007.95	2018	74 456	11 168 378	0.93	10.85	1 116.84
2019	63 837	9 575 488	0.80	9.30	957.55	2019	74 456	11 168 378	0.93	10.85	1 116.84
2020	60 645	9 096 713	0.76	8.84	909.67	2020	74 456	11 168 378	0.93	10.85	1 116.84
<b>Total</b>	<b>356 867</b>	<b>50 529 998</b>	<b>9.64</b>	<b>112.05</b>	<b>11 533.45</b>	<b>Total</b>	<b>372 279</b>	<b>55 841 888</b>	<b>10.26</b>	<b>119.35</b>	<b>12 285.22</b>
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA						SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016					
Administrative buildings, central government						Administrative buildings, central government					
Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)			Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)		
			ktoe	GWh	t CO <sub>2</sub>				ktoe	GWh	t CO <sub>2</sub>
2016	143 912	22 336 755	1.87	21.70	2 233.63	2016	148 912	22 336 755	1.87	21.70	2 233.63
2017	134 021	20 103 080	1.68	19.53	2 010.31	2017	148 912	22 336 755	1.87	21.70	2 233.63
2018	120 618	18 092 772	1.51	17.58	1 809.28	2018	148 912	22 336 755	1.87	21.70	2 233.63
2019	108 557	16 283 494	1.36	15.82	1 628.35	2019	148 912	22 336 755	1.87	21.70	2 233.63
2020	97 701	14 655 145	1.22	14.24	1 465.51	2020	148 912	22 336 755	1.87	21.70	2 233.63
<b>Total</b>	<b>609 808</b>	<b>91 471 245</b>	<b>18.11</b>	<b>210.61</b>	<b>21 676.04</b>	<b>Total</b>	<b>744 559</b>	<b>111 683 775</b>	<b>20.53</b>	<b>238.71</b>	<b>24 570.43</b>
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA						SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016					
Administrative buildings, central government						Administrative buildings, central government					
Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)			Year	GFA, m <sup>2</sup>	Investments, BGN (w/o VAT)	Savings (FEC and emissions)		
			ktoe	GWh	t CO <sub>2</sub>				ktoe	GWh	t CO <sub>2</sub>
2016	104 238	15 635 729	1.31	15.19	1 563.57	2016	104 238	15 635 729	1.31	15.19	1 563.57
2017	96 942	14 541 223	1.21	14.13	1 454.12	2017	104 238	15 635 729	1.31	15.19	1 563.57
2013	90 156	13 523 342	1.13	13.14	1 352.33	2018	104 238	15 635 729	1.31	15.19	1 563.57
2019	83 845	12 576 708	1.05	12.22	1 267.67	2019	104 238	15 635 729	1.31	15.19	1 563.57
2020	77 976	11 696 338	0.98	11.36	1 169.63	2020	104 238	15 635 729	1.31	15.19	1 563.57
<b>Total</b>	<b>453 156</b>	<b>67 973 343</b>	<b>13.16</b>	<b>153.00</b>	<b>15 746.63</b>	<b>Total</b>	<b>521 191</b>	<b>78 173 643</b>	<b>14.37</b>	<b>167.10</b>	<b>17 199.30</b>

Table 2-7: Performance achieved by each ministry in each scenario

INSTITUTION		Ministry of Interior										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		822 629.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		41 131	6 169 718	39 075	5 861 232	37 121	5 568 170	35 265	5 289 762	33 502	5 025 273	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		41 131	6 169 718	41 131	6 169 718	41 131	6 169 718	41 131	6 169 718	41 131	6 169 718	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		82 263	12 339 435	74 037	11 105 492	66 633	9 994 942	59 970	8 995 448	53 973	8 095 903	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		82 263	12 339 435	82 263	12 339 435	82 263	12 339 435	82 263	12 339 435	82 263	12 339 435	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		57 584	8 637 605	53 553	8 032 972	49 804	7 470 664	46 318	6 947 718	43 076	6 461 377	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		57 584	8 637 605	57 584	8 637 605	57 584	8 637 605	57 584	8 637 605	57 584	8 637 605	35.00%
INSTITUTION		Ministry of Health										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		49 668.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		2 483	372 510	2 359	353 885	2 241	336 190	2 129	319 381	2 023	303412	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		2 483	372 510	2 483	372 510	2 483	372 510	2 483	372 510	2 483	372 510	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		4 967	745 020	4 470	670 518	4 023	603 466	3 621	543 120	3 259	488 808	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		4 967	745 020	4 967	745 020	4 967	745 020	4 967	745 020	4 967	745 020	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		3 477	521 514	3 233	485 008	3 007	451 057	2 797	419 483	2 601	390 120	30.43%

<b>SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016</b>	3 477	521 514	3 477	521 514	3 477	521 514	3 477	521 514	3 477	521 514	35.00%
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INSTITUTION		Ministry of Agriculture and Food										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		11 017.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		551	82 628	523	78 496	497	74 571	472	70 843	449	67 301	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		551	82 628	551	82 628	551	82 628	551	82 628	551	82 628	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		1 102	165 255	992	148 730	892	133 857	803	120 471	723	108 424	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		1 102	165 255	1 102	165 255	1 102	165 255	1 102	165 255	1 102	165 255	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		771	115 679	717	107 581	667	100 050	620	93 047	577	86 534	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		771	115 679	771	115 679	771	115 679	771	115 679	771	115 679	35.00%
INSTITUTION		Ministry of Economy, Ministry of Energy										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		47 228.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		2 361	354 210	2 243	336 500	2 131	319 675	2 025	303 691	1 923	288 506	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		2 351	354 210	2 361	354 210	2 361	354 210	2 361	354 210	2 351	354 210	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		4 723	708 420	4 251	637 578	3 825	573 820	3 443	516 438	3 099	464 794	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		4 723	708 420	4 723	708 420	4 723	708 420	4 723	708 420	4 723	708 420	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		3 306	495 894	3 075	461 181	2 859	428 899	2 659	398 876	2 473	370 955	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		3 306	495 894	3 306	495 894	3 306	495 894	3 306	495 894	3 306	495 894	35.00%

INSTITUTION		Ministry of Environment and Water										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		33 102.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		1 655	248 265	1 572	235 852	1 494	224 059	1 419	212 856	1 348	202 213	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		1 665	248 265	1 655	248 265	1 655	248 265	1 655	248 265	1 655	248 265	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		3 310	496 530	2 979	446 877	2 681	402 189	2 413	361 970	2 172	325 773	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		3 310	496 530	3 310	496 530	3 310	496 530	3 310	496 530	3 310	496 530	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		2 317	347 571	2 155	323 241	2 004	300 614	1 864	279 571	1 733	260 001	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		2 317	347 571	2 317	347 571	2 317	347 571	2 317	347 571	2 317	347 571	35.00%
INSTITUTION		Ministry of Justice										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		189 153.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		9 458	1 418 648	8 985	1 347 715	8 536	1 280 329	8 109	1 216 313	7 703	1 155 497	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		9 458	1 418 648	9 458	1 418 648	9 458	1 418 648	9 458	1 418 648	9 458	1 418 648	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		18 915	2 837 295	17 024	2 553 566	15 321	2 298 209	13 789	2 068 388	12 410	1 861 549	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		18 915	2 837 295	18 915	2 837 295	18 915	2 837 295	18 915	2 837 295	18 915	2 837 295	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		13 241	1 986 107	12 314	1 847 079	11 452	1 717 784	10 650	1 597 539	9 905	1 485 711	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		13 241	1 986 107	13 241	1 986 107	13 241	1 986 107	13 241	1 986 107	13 241	1 986 107	35.00%



INSTITUTION		Ministry of Regional Development										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		34 993.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		1 750	262 448	1 662	249 325	1 579	236 859	1 500	225 016	1 425	213 765	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		1 750	262 448	1 750	262 448	1 750	262 448	1 750	262 448	1 750	262 448	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		3 499	524 895	3 149	472 406	2 834	425 165	2 551	382 648	2 296	344 384	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		3 499	524 895	3 499	524 895	3 499	524 895	3 499	524 895	3 499	524 895	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		2 450	367 427	2 278	341 707	2 119	317 787	1 970	295 542	1 832	274 854	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		2 450	367 427	2 450	367 427	2 450	367 427	2 450	367 427	2 450	367 427	35.00%
INSTITUTION		Ministry of Labour and Social Policy										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		26 895.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		1 345	201 713	1 278	191 627	1 214	182 046	1 153	172 943	1 095	164 296	22.62%
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		1 345	201 713	1 345	201 713	1 345	201 713	1 345	201 713	1 345	201 713	25.00%
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		2 690	403 425	2 421	363 083	2 178	326 774	1 961	294 097	1 765	264 687	40.95%
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		2 690	403 425	2 690	403 425	2 690	403 425	2 690	403 425	2 690	403 425	50.00%
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		1 883	282 398	1 751	262 630	1 628	244 246	1 514	227 148	1 408	211 248	30.43%
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		1 883	282 398	1 883	282 398	1 883	282 398	1 883	282 398	1 883	282 398	35.00%

INSTITUTION		Ministry of Finance										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		159 685.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		7 984	1 197 638	7 585	1 137 756	7 206	1 080 868	6 845	1 026 824	6 503	975 483	22.62 %
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		7 984	1 197 638	7 984	1 197 638	7 984	1 197 638	7 984	1 197 638	7 984	1 197 638	25.00 %
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		15 969	2 396 275	14 372	2 155 748	12 934	1 940 173	11 641	1 746 155	10 477	1 571 540	40.95 %
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		15 969	2 395 275	15 969	2 395 275	15 969	2 395 275	15 969	2 395 275	15 969	2 395 275	50.00 %
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		11 178	1 676 693	10 395	1 559 324	9 668	1 450 171	8 991	1 348 659	8 362	1 254 253	30.43 %
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		11 178	1 676 693	11 178	1 676 693	11 178	1 676 693	11 178	1 676 693	11 178	1 676 693	35.00 %
INSTITUTION		Ministry of Education and Science										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>		12 437.00		INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS								% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA		622	93 278	591	88 614	561	84 183	533	79 974	507	75 975	22.62 %
SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016		622	93 278	622	93 278	622	93 278	622	93 278	622	93 278	25.00 %
SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA		1 244	186 555	1 119	167 900	1 007	151 110	907	135 999	816	122 399	40.95 %
SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016		1 244	186 555	1 244	186 555	1 244	186 555	1 244	186 555	1 244	186 555	50.00 %
SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA		871	130 589	810	121 447	753	112 946	700	105 040	651	97 687	30.43 %
SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016		871	130 589	871	130 589	871	130 589	871	130 589	871	130 589	35.00 %

Table 2-8: Combined performance by scenario, province administrations

INSTITUTION		Province administrations combined										
Non-ESM GFA as of 01.01.2016, m <sup>2</sup>	102 310.00	INVESTMENTS REQUIRED EACH YEAR TO ENSURE THAT THE RENOVATED BUILDINGS ACHIEVE THE ENERGY EFFICIENCY STANDARDS										% of GFA renovated by 2020
INDICATIVE BUILDING RENOVATION SCENARIOS		2016		2017		2018		2019		2020		%
		GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	GFA to renovate, m <sup>2</sup>	BGN p.a. (w/o VAT)	
<b>SCENARIO A1: Renovate 5 % of the remaining non-ESM GFA</b>		5 116	767 325	4 860	728 959	4 617	692 511	4 386	657 885	4 167	624 991	22.62%
<b>SCENARIO A2: Renovate 5 % of all non-ESM GFA as of 01.01.2016</b>		5 116	767 325	5 116	767 325	5 116	767 325	5 116	767 325	5 116	767 325	25.00%
<b>SCENARIO B1: Renovate 10 % of the remaining non-ESM GFA</b>		10 231	1 534 650	9 208	1 381 185	8 287	1 243 067	7 458	1 118 760	6 713	1 006 884	40.95%
<b>SCENARIO B2: Renovate 10 % of all non-ESM GFA as of 01.01.2016</b>		10 231	1 534 650	10 231	1 534 650	10 231	1 534 650	10 231	1 534 650	10 231	1 534 650	50.00%
<b>SCENARIO C1: Renovate 7 % of the remaining non-ESM GFA</b>		7 162	1 074 255	6 660	999 057	6 194	929 123	5 761	864 085	5 357	803 599	30.43%
<b>SCENARIO C2: Renovate 7 % of all non-ESM GFA as of 01.01.2016</b>		7 162	1 074 255	7 162	1 074 255	7 162	1 074 255	7 162	1 074 255	7 162	1 074 255	35.00%

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

<i>Title of the measure in the context of the State's energy efficiency policy</i>	<i>Type of the measure</i>	<i>Status of the measure</i>	<i>Implement by</i>	<i>Responsible institution and related partner institutions</i>	<i>Expected result</i>	<i>Potential financing sources</i>
<p>1. Develop energy efficiency programmes for ministries, agencies and province administrations in respect of the buildings occupied by their central administrations.</p> <p>These programmes should be consistent with and linked to the objectives and measures laid down in the national documents referred to Article 4 and in points 1–4 of Article 5(3) ZEE.</p> <p>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 occupancy of the building.</p> <p>Each programme should ensure that results are monitored and should provide for appropriate measures where the programme fails to make satisfactory progress.</p> <p>Designated managers at senior level will steer the implementation of the measure.</p>	Administrative	On-going	March 2018	All ministries, agencies and province administrations	<p>1. Programmes at ministry, agency or province administration level developed and approved.</p> <p>2. Prioritised list of the buildings of each institution and priority energy saving measures identified.</p> <p>3. Programme steering teams designated at each institution, external experts involved where appropriate to support the implementation of the programmes.</p>	<p>Within the confines of the approved national budget.</p> <p>Public-private partnerships (PPPs) with obligated parties as per Article 14(4) ZEE or with ESCO</p>

<p>2. Update the institutions' internal public procurement rules so that the central government purchases only products, services and buildings which comply with stringent energy efficiency standards.</p>	Regulatory	Planned	April 2018	The public procurement directorates or units of ministries, agencies and province administrations	Internal public procurement rules of central government institutions adapted to the requirements of Directive 2012/27/EU.	Within the confines of the approved national budget
<p>3. Embed energy efficiency management functions in central government institutions and in province administrations.</p>	Administrative	Planned	2020	Ministries, agencies and province administrations	Systems for the management of energy efficiency of buildings deployed at central government institutions and province administrations.	PPPs with obligated parties as per Article 14(4) ZEE or with ESCO
<p>4. Develop a set of standard data forms for the purpose of collecting information on (i) energy demand in the buildings, (ii) completed energy efficiency measures, (iii) energy savings achieved, and (iv) energy management levels in central government buildings.</p>	Administrative	On-going	2018	The AUER in partnership with the ME/MRRB	Improved basis for the collection of information on the energy efficiency levels of central government buildings and for feeding accurate and reliable data on the state of energy efficiency into the national information system (maintained by the AUER as per Article 11(6)(8) ZEE).	Within the confines of the approved national budget

<p>5. Renovate buildings occupied by central government using financial resources provided under priority axis ‘Energy efficiency in administrative and residential buildings’, OPRG 2014–2020.</p>	Investment	Planned	2018–2020	The MRRB	<p>1. Energy savings at FEC level in State-owned buildings occupied by central government following their renovation to the NZEB standard.</p> <p>2. Energy saving certificates granted by the AUER to NZE buildings.</p>	OPRG 2014–2020
<p>6. Undertake major renovation of the GFA of central government buildings by applying energy saving measures based on the ‘cost-benefits’ ratio with the aim to achieve the regulatory energy efficiency standards, including above-minimum energy consumption class or the national NZEB definition.</p>	Investment	Planned	2018–2020	Ministries, agencies and province administrations	<p>1. Energy savings at FEC level in State-owned buildings occupied by central government following their renovation to the NZEB standard.</p> <p>2. Energy saving certificates granted by the AUER to NZE buildings.</p>	<p>The Energy Efficiency and Renewable Sources Fund (FEEVI)</p> <p>Programme BG04 ‘Energy efficiency and renewable energy’</p> <p>National Trust Ecofund</p> <p>PPPs with obligated parties as per Article 14(4) ZEE or with ESCO</p>

<p>7. Promote new technologies for the implementation of energy saving measures in State-owned buildings.</p>	<p>Administrative</p>	<p>Planned</p>	<p>2017–2020</p>	<p>The AUER in collaboration with businesses, municipalities and international partners</p>	<p>Good practices exchanged and legislative proposals formulated for improving the administrative arrangements related to energy efficiency.</p>	<p>Within the confines of the approved national budget PPPs</p>
<p>8. Conduct an analysis of the implementation of the central government’s energy efficiency programmes as part of the implementation of the National plan for the improvement of the energy performance of heated and/or cooled State-owned buildings used by the State administration.</p>	<p>Administrative</p>	<p>Planned</p>	<p>2020</p>	<p>The AUER supported by the MRRB/ME</p>	<p>Completed assessment of progress as regards energy consumption of central government buildings, including the remaining potential for cost-efficient savings.</p>	<p>Within the confines of the approved national budget</p>

#### **4. LIST OF BUILDINGS**

In accordance with Article 11(6)(5) ZEE, the AUER Executive Director publishes by 31 March each year a list of the buildings referred to in Article 27(1)(4) ZEE which, as of 1 January of the relevant year, are not compliant with the minimum energy performance requirements set in a regulation issued pursuant to Article 31(4) ZEE.

The list is available at <http://www.seea.government.bg/bg/spisaci>.



## 5. CONCLUSION

### 5.1 Direct benefits: energy saving effect and environmental impact

Table 5-1 provides a consolidated view of the outcomes from the scenarios considered by 2020. The contribution of the projected savings to the national indicative target is determined without considering the obligated parties referred to in Article 14(4) ZEE.

*Table 5-1 Projected savings in each scenario by 2020*

Indicative scenario	HEADLINE PROJECTIONS 2020				
	Investments, BGN	Savings (FEC and emissions)			t CO <sub>2</sub>
		ktoe	GWh	Contribution to the national target, %	
Scenario A1	50 529 998	9.64	112.05	4.19 %	11 533.45
Scenario A2	55 341 888	10.26	119.35	4.46 %	12 285.22
Scenario B1	91 471 245	18.11	210.61	7.87 %	21 678.04
Scenario B2	111 683 775	20.53	238.71	8.93 %	24 570.43
Scenario C1	67 973 343	13.16	153.00	5.72 %	15 743.63
Scenario C2	78 178 643	14.37	167.10	6.25 %	17 199.30

Scenario A2 will be implemented until 2020 within the confines of the approved national budget and using all applicable financing options indicated in the present Plan and in NPDEE 2014–2020.

### 5.2 Other indirect benefits

In addition to the direct benefits highlighted above, the implementation of the present Plan would contribute to:

- promoting the exemplary role of buildings occupied by public authorities;
- enhancing the administrative capacity of the central government’s administration and accordingly better energy efficiency regulation;
- providing better thermal comfort and working environments to civil servants;
- strengthening the institutional interoperability of functions and responsibilities;
- improving the provision of administrative services for citizens owing to the occupancy of a better and healthy environment.