REPUBLIC OF BULGARIA

Ministry of Economy and Energy

NATIONAL ENERGY EFFICIENCY ACTION PLAN

2014–2020

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LIST OF ACRONYMS AND ABBREVIATIONS

NPP	Nuclear power plant
AUER	Sustainable Energy Development Agency
GDP	Gross domestic product
DHW	Domestic hot water
HECG	High-efficiency cogeneration
RES	Renewable energy sources
RES(e)	Electricity from renewable energy sources
RES(h)	Heat from renewable energy sources
WSS	Water supply and sewage services
VNPDEE	Second National Energy Efficiency Action Plan
VAT	Value added tax
EED	Directive 2012/27/EU on energy efficiency
DKEVR	State Energy and Water Regulatory Commission
MS	Member State
EBRD	European Bank for Reconstruction and Development
EE	Energy efficiency
EC	European Commission
EU	European Union
ESCO	Energy savings performance contract
EC	European Community
ZE	Energy Act
ZEVI	Energy from Renewable Sources Act
ZEE	Energy Efficiency Act
ZID	Act amending and supplementing an existing act
ZOP	Public Procurement Act
ZOOS	Environment Protection Act
ZUT	Territorial Planning Act
FEI	Final energy intensity

FEC	Final energy consumption
REECL	Residential Energy Efficiency Credit Line
MIE	Ministry of Economy and Energy
MIP	Ministry of Investment Planning
MZH	Ministry of Agriculture and Food
MOSV	Ministry of the Environment and Water
MRR	Ministry of Regional Development
MRRB	Ministry of Regional Development and Public Works
CoM	Council of Ministers
SME	Small and medium-sized enterprises
KIDSF	Kozloduy International Decommissioning Support Fund
NEK	Natsionalna Elektricheska Kompania
NPDEVI	National Renewable Energy Action Plan
NPDEE	National Energy Efficiency Action Plan
NPDIK	National Climate Change Action Plan
NSI	National Statistical Institute
HVAC	Heating, ventilation and air-conditioning
OP	Operational Programme
OPRD	Operational Programme ‘Regional Development’
GHG	Greenhouse gases
PEI	Primary energy intensity
PEC	Primary energy consumption
PNPDEE	First National Energy Efficiency Action Plan
IS	Industrial systems
TFA	Total floor area
ETS	Emission trading scheme
TPP	Thermal power plants
FEEVI	Energy Efficiency and Renewable Sources Fund
FEEI	Energy and Energy Savings Fund
CHPP	Combined heat and power plant

UNITS OF MEASURE

y	Year
kg	Kilogram
kgoe	kilogram oil equivalent
m^2	square metre
mpkm	million passenger-kilometres
mtkm	million tonne-kilometres
GWh	gigawatt-hour
kJ	kilojoule
ktoe	kilotonne oil equivalent
kW	Kilowatt
kWh	kilowatt-hour
MJ	Megajoule
mtoe	million tonne oil equivalent
MW	Megawatt
MWel	megawatt electrical capacity
MWh	megawatt-hour
TJ	terajoule
U	heat transmission factor
W/m^2K	watts per square meter required to achieve a temperature difference of 1 Kelvin

1. INTRODUCTION

The objective of Directive 2012/27/EU on energy efficiency is to establish a common framework for promoting energy efficiency in the EU in order to reduce primary energy consumption by 20 % by the year 2020 and establish conditions for improving energy efficiency thereafter. The objectives of the measures are to utilise energy saving potential across the entire energy sector – from production, transmission and distribution to final consumption, including in the industrial and building sectors; to overcome the regulatory and non-regulatory barriers to the market, to increase consumer awareness and to formulate national energy efficiency targets for 2020.

The National Energy Efficiency Action Plan is developed in accordance with the EED requirements on the basis of a template which ensures the inclusion of all obligations. The requirements of Directive 2010/31/EU on the energy performance of buildings are also taken into account.

The energy policy of the Republic of Bulgaria is fully aligned with that of the European Union in terms of energy security, competitiveness and sustainable development. The Energy Strategy of the Republic of Bulgaria for the period to 2020 confirms that 'energy efficiency has the highest priority in the country's energy policy'. This has served as a basis for setting ambitious energy-efficiency improvement targets.

Macroeconomic factors

The impact of the economic crisis meant that the forecasts underlying the Energy Strategy were largely missed in the years following its adoption. GDP growth was much lower than expected, while primary energy intensity, rather than decreasing, actually rose in two consecutive years (2010 and 2011) and had still not returned to its lowest level by 2012.

A slow economic recovery is now expected following the end of the economic crisis.

According to the reference scenario adopted in the NPDEE, GDP is expected to grow by up to 2.2 % p.a. between 2014 and 2020.

The pervasive impact of the economic crisis on all business entities and the subsequent slow recovery in the living standards of Bulgarian households were taken into consideration when

setting the energy-efficiency targets, which take into account the limited local funding sources.

The impact of the economic crisis

Bulgaria 'hit the bottom' of the economic crisis in 2008–2009, as national GDP declined by 5.5 % p.a.

The crisis interrupted the energy efficiency improvement process that had been unfolding over the previous seven years, and caused a temporary increase in the energy intensity of the country's GDP. After 2009, FEI and PEI began to rise, a trend which continued until 2011. During that period, FEI was increasing by approximately 2.3 % p.a. and PEI by nearly 1 % p.a. A deterioration of energy efficiency parameters was observed across all sectors of final energy consumption.

Changes in energy consumption

Primary energy consumption during the period 2000–2012 is illustrated in Figure 1-1:

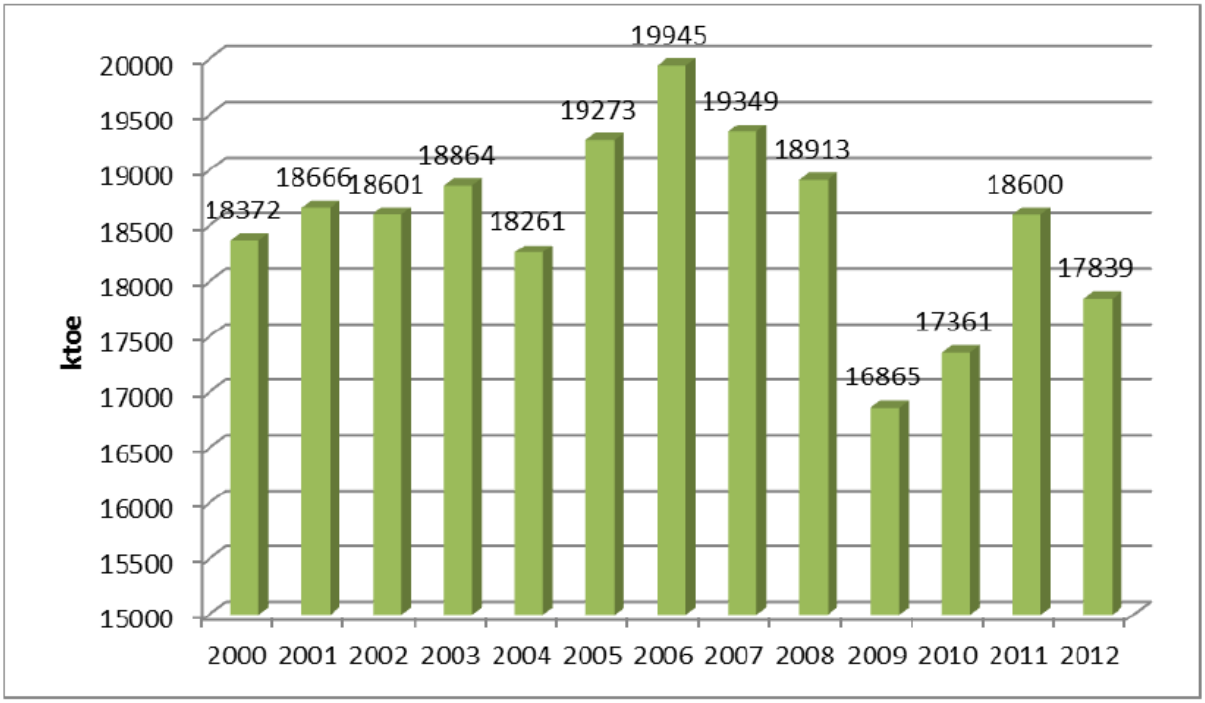


Figure 1-1: Primary energy consumption, 2000–2012, ktoe

PEC did not exhibit a steady upward trend in the period 2000–2012.

In 2012, the primary energy consumption of Bulgaria was 18 305 ktoe. The impact of the economic crisis saw it fall to 17 444 ktoe in 2009. It then rose again over the next two years,

but failed to return to the pre-crisis level. In 2012, PEC again fell by 4.2 % as compared to 2011.

One positive trend is the increase in the use of energy from renewable sources (RES), which reached 1 624 ktoe in 2012. RES accounted for 8.9 % of primary energy consumption in 2012.

Figure 1-2 illustrates how final energy consumption fared during the period 2000–2012:

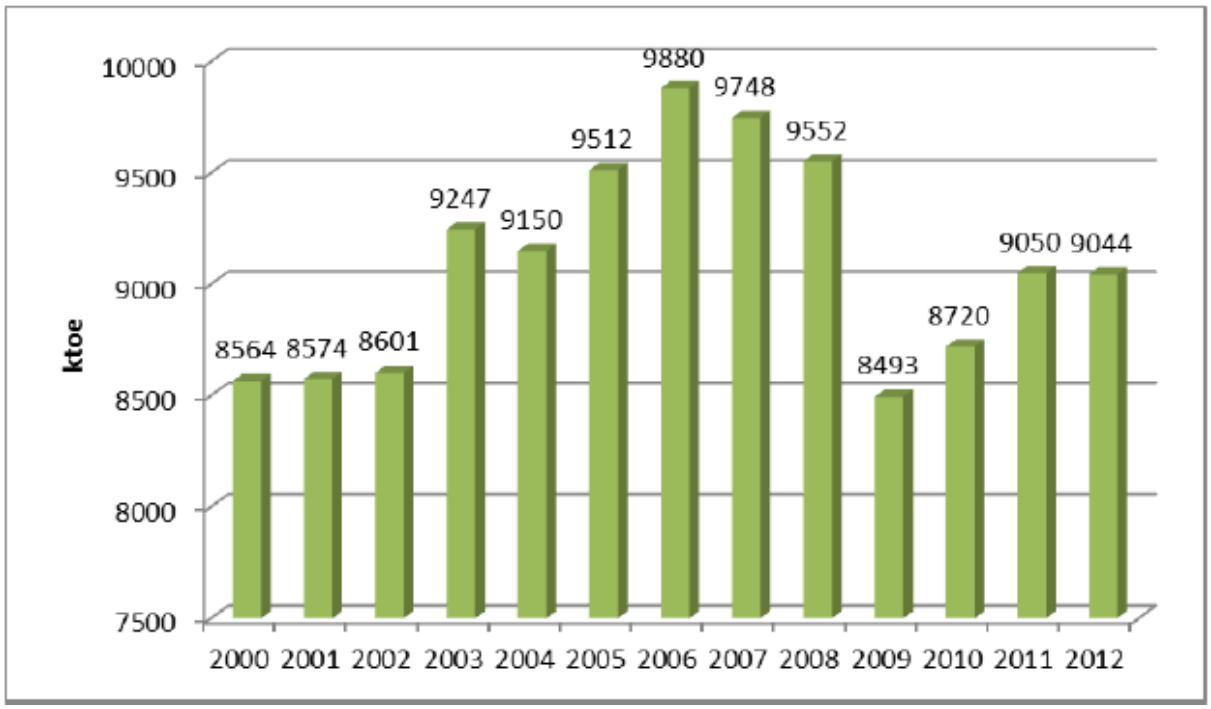


Figure 1-2: Final energy consumption, 2000–2012, ktoe

Final energy consumption in 2012 was 9 044 ktoe, slightly lower than the 2011 level.

FEP dropped to 8 493 ktoe in 2009 and then rose again to 9 050 ktoe in 2011, but failed to reach the pre-crisis level.

- ***Energy intensity***

Energy intensity is the main indicator of how efficiently energy is used. It gauges the amount of energy used per GDP unit at 2005 prices. The changes in primary and final energy intensity per GDP unit are the two main metrics for assessing energy efficiency at macro level. Figure 1-3 tracks the movement of these two indicators in the period 2000–2012.

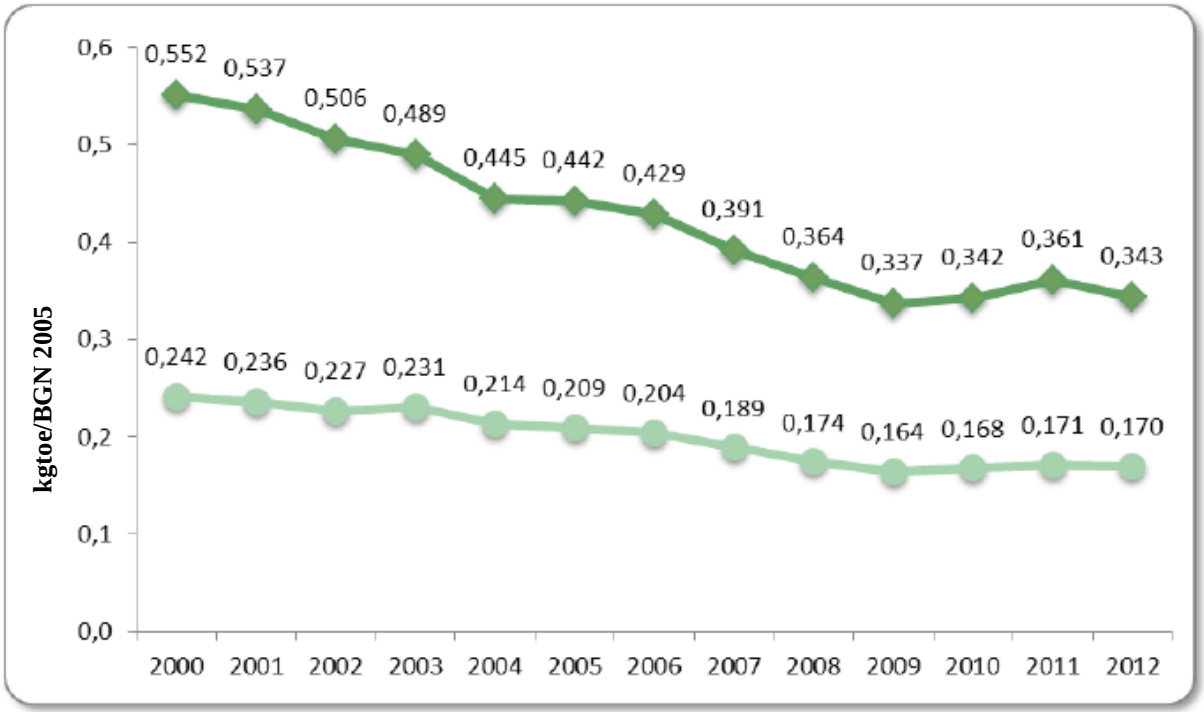


Figure 1-3: Final and primary energy efficiency, 2000–2012, kgoe/BGN 2005

The pre-crisis period from 2000 to 2009 was characterised by a sustained and relatively fast decrease in primary and final energy intensity in Bulgaria.

In 2010 and 2011, energy intensity increased as a consequence of the economic crisis.

In 2012, both PEI and FEI resumed the downward trend, but still were unable to return to the lowest levels they reached in 2009.

Changes in energy imports and exports

Favourable conditions for the export of electricity have been created and continue to exist due to the following factors:

- relatively stable electricity consumption during the past five years;
- production capacity that significantly exceeds demand;
- a rapid increase in the amount of electricity produced from RES.

These preconditions have driven a sustainable increase in electricity exports, which have risen by 32 % over the past 10 years.

An even more pronounced trend can be observed for petroleum-derived liquid fuels. While domestic consumption has declined by 8 % over the last 10 years, liquid fuel exports have increased by a factor of 2.6.

Structural changes

In the period 2000–2012, the following changes occurred in the respective shares of the various fuels and energy sources contributing to the FEC mix:

- the share of coal decreased by - 6.9 %
- the share of liquid fuels decreased by - 1.4 %
- the share of natural gas decreased by - 0.3 %
- the share of biomass increased by + 6.3 %
- the share of electricity increased by + 1.8 %
- the share of heat increased by + 0.5 %

Thus, there was significant change in the FEC mix during the 12 years from 2000 to 2012:

- a considerable proportion of coal was replaced by biomass and heat;
- electricity increased its share at the expense of liquid fuels and natural gas.

The FEC shifts during the period 2000–2012 also modified the structure of PEC. The most significant changes were as follows:

- the share of coal decreased by - 4.1 %
- the share of crude oil increased by + 2.0 %
- the share of natural gas decreased by - 0.3 %
- the share of nuclear energy and RES(e) increased by + 1.3 %
- the share of RES(h) increased by + 1.0 %

The most significant change in the PEC resulting from the shifts in the FEC mix over the 12-year period is the relative decrease in coal use as compared to that of nuclear energy and energy from RES.

Developments in other sectors (e.g. RES, nuclear energy, carbon dioxide capture and storage, etc.)

In an environment of intense stimulation through preferential tariffs and mandatory purchases, electricity output from RES(e) has seen very strong development.

Electricity production from RES doubled between 2007 and 2013. By the end of 2013, the total number of RES plants exceeded 1 800 and the overall installed capacity was more than 4 GW, producing more than 6 TWh of electricity.

During the same period, heat generation from RES grew by a factor of 1.5.

While overall energy consumption remains stable, the consumption (and production) of energy from RES is gaining momentum at the expense of energy from traditional sources.

Despite the difficulties experienced, arising mainly from the global economic crisis, it is clear that the current VNPDEE is achieving its goals.

The national target for the period 2008 to 2013 was 4 860 GWh/y. The cumulative energy savings during this period are estimated at 5 472 GWh/y. This means that the national energy saving target has been exceeded by 12.6 %.

As part of the 2013 update of the reference scenarios for EU Member States for the period to 2050, the National Technical University of Athens updated the Bulgarian scenario in its document 'Bulgaria: Reference scenario –– Detailed Analytical Results' (7 January 2013). The updated GDP growth, energy consumption and energy intensity forecasts according to that scenario are as follows:

- GDP is expected to grow by an average of 2.2 % per year by 2020;
- Primary energy consumption will see a marginal increase from 17.8 Mtoe in 2010 to 18.5 Mtoe in 2020;
- Between 2010 and 2020, primary energy intensity is forecasted to decrease by 1.9 % p.a. on average;
- Consumption of energy from RES is expected to rise from 1.45 Mtoe in 2010 to 1.95 Mtoe in 2020.

2. OVERVIEW OF NATIONAL ENERGY EFFICIENCY TARGETS AND SAVINGS

2.1 NATIONAL 2020 ENERGY EFFICIENCY TARGETS

The national energy efficiency target is determined using the 'bottom-up' method on the basis of:

- Bulgaria's reference energy consumption scenario as set out in the report 'Bulgaria: Reference scenario — Detailed Analytical Results' by the National Technical University of Athens (7 January 2013). The forecasts in the report are based on the Primes Version 4 energy forecasting method;
- an assessment of the economic energy saving potential under the reference scenario.

The following data was used to assess the economic energy saving potential for the period to 2020:

- additional financial resources available for improving energy efficiency;
- investment required per unit of saved energy based on the audits of buildings and industrial systems in the framework of the ZEE;
- estimation of economic energy-saving potential by final-consumption sectors under a policy that places a high priority on energy efficiency (Economic Potential – High Policy Intensity as per the report 'Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries: Final Report' by the Fraunhofer-Institute for Systems and Innovation Research; ENERDATA (Grenoble, France); the Institute of Studies for the Integration of Systems, ISIS (Rome, Italy); Vienna University of Technology (Vienna, Austria); and the Wuppertal Institute for Climate, Environment and Energy, WI (Wuppertal, Germany).

Bulgaria sets the following indicative national energy-saving targets for the period to 2020:

- Energy savings at FEC level: **716 ktoe/y**;
- Energy savings at PEC level: **1 590 ktoe/y,** including **169 ktoe/y** in energy transformation, transmission and distribution processes.

The additional energy savings at FEC level were based on a scenario with strong EE policy and optimal use of the additional financial resources available to Bulgaria from various sources, namely:

- EU funds and programmes (in the programming period 2014–2020);
- obligated parties (on the basis of the energy traders obligations scheme);
- local sources; and
- the national budget.

The contributions of these financial sources to the achievement of the national 2020 FEC saving target of 716 ktoe would be as follows:

- Optimal usage of financial resources available: **230 ktoe/y**;
- Fulfilment of the individual targets of energy traders under the obligations scheme: **486 ktoe/y.**

The above estimates include the energy-saving effects achieved by optimising the national budget's contribution to the use of financial resources from EU programmes and funds, maximising the involvement of local financial sources in the use of financial resources from EU programmes and funds, and supporting energy traders in their efforts to accomplish their individual targets under the obligations scheme.

The achievement of the above national energy-saving and energy-efficiency targets by 2020 will reduce FEC in the year 2020 from **18 460 ktoe**, as per the reference scenario, to **16 870 ktoe**.

The indicative national energy-efficiency target is calculated on the basis of the above energy-saving targets being achieved and is defined as a 41 % reduction of PEI in Bulgaria in 2020 as compared to 2005.

Table 2.1-1: *Primary and final energy consumption expected under the reference and target scenarios*

Indicator	Year	2012	2016	2020
PEC — reference scenario	ktoe	18 305	18 382	18 460
PEC — target scenario	ktoe	-	17 587	16 870
FEC — reference scenario	ktoe	9 044	9 200	9 355
FEC — target scenario	ktoe	-	8 842	8 639
FEC saving target	ktoe	-	358	716
PEC saving target	ktoe	-	795	1 590

The measures designed to encourage the accomplishment of the energy-saving target should be focused on the areas identified above.

Table 2.1-2: *Energy production and consumption forecast 2020*

No	Energy consumption forecast 2020	ktoe
1	PEC total	16 870
2	Fuel and energy input for transformation at TPPs	7 230
3	Electricity produced by transformation at TPPs	2 656
4	Fuel and energy input for transformation at CHPPs	2 355
5	Heat produced by transformation at CHPPs	1 098
6	Electricity produced by transformation at CHPPs	668
7	Losses in energy distribution (all fuels)	397
8	FEC in total	8 639
9	FEC Industry	2 585
10	FEC Transport	2 554
11	FEC Households	2 245
12	FEC Services and Agriculture	1 255

2.2 ADDITIONAL ENERGY EFFICIENCY TARGETS

The need to improve EE in Bulgaria is one of the main priorities of the Bulgarian government. The first dedicated Energy Efficiency Act (ZEE) was adopted in 2004. A new ZEE was adopted in 2008, transposing the requirements of Directive 2006/32/EC on energy end-use efficiency and energy services and Directive 2002/91/EC on the energy performance of buildings. A new Act amending and supplementing the ZEE, adopted in March 2013, fully transposed Directive 2010/31/EU on the energy performance of buildings.

In fulfilment of the requirements of the ZEE and in accordance with the provisions of Directive 2006/32/EC on energy end-use efficiency and energy services, Bulgaria has adopted an indicative energy-saving target for 2016 of at least 9 % of the average FEC value for the period 2001-2005, i.e. the target covers a period of 9 years. Accordingly, Bulgaria developed and implemented First (2008–2010) and Second (2011–2013) three-year national EE action plans containing concrete EE improvement measures at the level of final energy consumption.

In accordance with the ZEE, the national energy-saving target is allocated in the form of individual energy-saving targets to three groups of obligated parties:

- energy traders;
- owners of public services buildings in use with a total floor area of more than 500 m^2 up to 9 July 2015 and a total floor area of more than 250 m^2 after that date;
- owners of industrial systems consuming more than 3 000 MWh of energy per annum.

2.3 PRIMARY ENERGY SAVINGS

The measures designed to encourage the accomplishment of the energy-saving target should be focused on the areas identified above.

The achieved and projected primary and final energy savings are illustrated in Table 2.3.1.

- The FEC savings achieved by 2012 are estimated using the 'bottom-up' method and the corresponding primary energy savings are estimated using the real final-to-primary consumption ratio in 2012.
- The projected FEC and PEC savings are estimated using the 'bottom-up' method. A more detailed description of the method and of the data used, including savings in the energy transformation, transmission and distribution processes, is provided in Table 2.3.1.

Table 2.3-1: *Overview of the projected PEC and FEC savings*

Period	PEC savings, ktoe	FEC savings, ktoe
2006–2012, achieved	906.6	446.8
2014–2016, projected	795.0	358.0
2014–2020, projected	1 590.0	716.0

2.4 FINAL ENERGY SAVINGS

2.4.1 FINAL ENERGY SAVINGS ACHIEVED AND FEC SAVINGS PROJECTED BY 2016

The table below provides details about the progress of the implementation of the First and Second Energy Efficiency Action Plans, 2008–2016. The calculations on the implementation of the PNPDEE and VNPDEE take into account the savings achieved and expected through implementation of the Plan in 2011 and 2012.

Table 2.4.1-1: *Cumulative achievement of the national energy-saving target, 2008-2013*

Period	Target for the period		Savings achieved	
	%	GWh/y	%	GWh/y
2008–2010	3	2 430	4.40	3 549
2008–2013	6	4 860	6.76	5 472
2008–2016	9	7 291[1]		

The predefined national target for the period 2008–2013 is 4 860 GWh/y, which is equal to 6 % of the baseline FEC value within the scope of the ZEE.

At present, the cumulative energy savings in 2008–2013 are estimated at 5 472 GWh/y, which is 6.76 % of the baseline FEC. This means that the national energy-saving target is exceeded by 0.76 %.

The overall fuel and energy savings achieved and expected as a result of the implemented measures were estimated after processing the following information received by the AUER:

- reports on the implementation of the energy-efficiency plans by central and local authorities in accordance with Article 12(1) of the ZEE;
- reports on the management of energy efficiency in accordance with Article 36(4) and (5) of the ZEE;

[1] National target

- energy-efficiency activities and measures completed by energy traders in accordance with Articles 40(2) and 41(1)(1) of the ZEE;
- reports from institutions on the fulfilment of their VNPDEE obligations in 2013;
- results from audits of IS and buildings;
- results from the inspections of boilers and air-conditioning systems;
- official websites of the relevant organisations.

Table 2.4.1-2: *Summary of the achievement of the national energy-saving target by sector, 2008-2013*

Sector	GWh/y	ktoe/y
Households	888.9	76.6
Services	914.6	78.8
Industry	808.1	69.7
Transport	935.0	80.4
Agriculture	182.5	15.7
Horizontal measures	1 743.4	150.3
Total	**5 472.1**	**471.5**

Note: In the Transport and Agriculture sectors, no reliable data for performing an overall assessment of the energy-saving effect during the period 2008–2013 is available. For this reason, data for 2013 was used.

2.4.2 METHODS USED FOR THE CALCULATION OF SAVINGS

The savings achieved were estimated using two methods: 'bottom-up' and 'top-to-bottom'.

The 'top-to-bottom' calculation method

The generic methodology recommended by the EC was used to calculate the energy savings achieved using the 'top-to-bottom' method. The 'top-to-bottom' calculation method clearly highlighted the trends in the country's overall energy consumption and helped identify the sectors or sub-sectors where efforts should concentrated. This was taken into account in the development of the PNPDEE and VNPDEE.

The 'bottom-up' calculation method

The 'bottom-up' calculation method was used to estimate the energy savings achieved as a result of the implementation of specific measures, projects and programmes to improve energy efficiency. The advantage of this method is that it can be applied to assess the energy-saving effect of each individual measure, package of measures or programme.

In using the 'bottom-up' calculation method to calculate the achieved fuel and energy savings, the obligated parties have ensured accurate measurements and appropriate selection of the previous and next values and parameters of these measurements.

In Bulgaria, the energy savings achieved must be demonstrated, as provided for in the *Regulation on the methodology for determination of national indicative targets, the procedure for allocation of these targets as individual energy-saving targets among the persons referred to in Article 10(1) of the Energy Efficiency Act, the eligible energy efficiency measures, the methodologies for assessment and the methods for verification of energy savings*. According to this Regulation, energy savings are presented in the form of PEC savings, FEC savings and CO_2 emission savings, on the basis of energy efficiency audits and calculations made using specific methodologies. The specific methodologies are developed by the AUER on the basis of:

- standardised methodologies recommended in regulatory documents of the EU;
- methodologies developed by persons authorised to perform energy-efficiency audits of buildings and industrial systems.

In 2012, 11 energy-savings assessment methodologies were developed and adopted. The 'bottom-up' method was used in their development. They contain a mechanism for the allocation of the energy savings by year throughout the entire period of the completed

measure and they are based on measurements and/or engineering estimates. The energy savings are determined before and after the implementation of the energy-efficiency measures with normalised adjustments that correspond to the impact of the specific climate conditions on energy use.

The calculation methods used can also reflect previous periods.

The total amount of savings achieved under any given measure or programme is the sum total of the combined savings achieved by all participants in and/or beneficiaries of the measure or programme concerned. This method avoids double counting of energy savings that result from combinations of measures or mechanisms to increase energy efficiency.

A multiplication effect may be included in the assessment of certain measures. In these cases, it is necessary to verify the combined energy-saving effect and apply adjustment factors in the subsequent assessment.

Energy efficiency indicators may be used to assess horizontal measures, provided that it is possible to determine how these indicators would change in future without the implementation of these measures. In such cases, it is necessary to exclude the double counting of energy savings achieved through energy efficiency programmes, energy services and other tools (such as energy or carbon dioxide taxes and awareness campaigns). Appropriate adjustments should be applied where it is not possible to avoid double counting of energy savings.

3. POLICY MEASURES IMPLEMENTING EED

3.1 HORIZONTAL MEASURES

3.1.1 ENERGY-EFFICIENCY OBLIGATION SCHEMES AND ALTERNATIVE POLICY MEASURES (EED ARTICLE 7, ANNEX XIV, PART 3.2)

Table 3.1.1-1: *Average energy sales to final users in the period 2010–2012*

Indicator	2010	2011	2012	Average
FEC ex transport, Ktoe	5 990	6 337	6 173	6 167

In the period 2014–2020, the minimum combined amount of new energy savings achieved by all energy traders may not be less than 1.5 % of the annual amount of energy sold to all final users. The obligations calculated in each year, both with and without the full use of the 25 % reduction permitted by Article 7(2), are provided in Table 3.1.1-2.

Table 3.1.1-2: *The obligations scheme by year (2014–2020), ktoe*

Year	Obligations ex transport	Obligations ex transport and with full use of the 25 % reduction permitted by Article 7(2)
2014	92.50	69.38
2015	185.00	138.75
2016	277.50	208.13
2017	370.00	277.50
2018	462.50	346.88
2019	555.00	416.25
2020	647.50	485.63

Bulgaria intends to make full use of the 25 % reduction permitted by Article 7(2) of the EED, as shown in the third column of the table.

The obligated parties include all energy distributors and/or retail energy sales companies, including transport fuel distributors and transport fuel retailers.

Obligated parties are energy traders that meet the following conditions:

1. Sales of energy to final energy users in the previous calendar year greater than the equivalent of 75 GWh (6.45 ktoe) p.a. and includes:
   - electricity traders selling to final energy users electricity in amounts exceeding 75 GWh/y;
   - heat transmission companies selling heat energy to final energy users in amounts exceeding 75 GWh/y;
   - natural gas traders selling more than 8 million normal cubic meters p.a. to final energy users;
   - liquid fuel traders selling liquid fuels in amounts exceeding 6.5 thousand tonnes p.a., excluding transport fuels, to final energy users;
   - solid fuel traders selling solid fuels in amounts exceeding 13 thousand tonnes p.a. to final energy users;
2. Employed more than 10 people in the previous year;
3. Had a turnover and/or balance sheet position at the end of the previous year of more than BGN 3.9 million in respect of energy trading.

The obligations scheme does not include transport fuel distributors or retailers.

A major factor in the accomplishment of the national energy-savings target defined in accordance with the requirements of Directive 2006/32/EC is the fulfilment of the individual energy-saving targets. As per Article 10 of the ZEE, the national energy-saving target is allocated in the form of individual energy-saving targets to three groups of obligated parties:

- energy traders;
- owners of state and/or municipal buildings in use with total floor area of more than 1000 m^2 (as of 12 March 2013 the threshold is reduced to 500 m^2);
- owners of industrial systems consuming more than 3 000 MWh of energy per annum.

The overall target to be achieved by all obligated parties is 5 984 GWh (516 toe), which accounts for 82 % of the overall national energy-saving target. The remaining 18 % is expected to be achieved by non-obligated parties, i.e. final energy users.

Table 3.1.1-3: *Achievement of individual energy-saving targets by obligated parties (in accordance with Directive 2006/32/EC)*

Obligated parties	Individual targets 2016	Achieved 2013	Achieved 2011–2013	Achieved 2008–2013	Performance
	GWh/y	GWh/y	GWh/y	GWh/y	%
Building owners	521	95.5	284.6	914.6	176
IS owners	839	91.2	255.5	317.5	38
Energy traders	4 644	156.0	934.4	1 743.4	38

3.1.2 ENERGY AUDITS AND MANAGEMENT SYSTEMS (EED ARTICLE 8)

The Energy Efficiency Act sets out a requirement for each industrial system that consumes more than 3 000 MWh of energy per year to be subject to mandatory energy-efficiency audits. These must be conducted at least once every five years. The owners of industrial systems are obliged to implement the measures prescribed by the energy-efficiency audit no later than 1 January 2016, in accordance with their status:

- Industrial systems owners with individual energy-saving targets are obliged to implement measures prescribed by the energy-efficiency audit that ensure the achievement of their respective individual energy-saving targets;
- Industrial systems owners without individual energy-saving targets are obliged to implement measures prescribed by the energy-efficiency audit that ensure the realisation of at least 50 % of the energy-saving potential established by the audit.

Table 3.1.2-1: *Assessment of the effect of implementation of the energy-efficiency improvement measures prescribed in the audit reports*

	2011	**2012**	**2013**	**Total**
Number of IS	94	82	17	**193**
Energy savings, GWh/p.a.	139.0	226.0	7.9	**372.9**
CO_2 emissions savings, kt/y	59.2	81.5	3.8	**144.5**
Financial savings, BGN million p.a.	15.5	53.7	1.1	**70.3**

The legislation provides for energy audits and certification of all public services buildings in use with a total floor area (TFA) of more than 500 m^2. At present, this measure is set out in Article 19(2) of the ZEE; Regulation No RD-16-1058 of 10 December 2009 on the energy consumption indicators and energy performance of buildings; Regulation No RD-16-1594 of 13 November 2013 on energy-efficiency audits, certification and assessment of energy savings in buildings (repealing Regulation No RD-16-1057 of 10 December 2009); and

Regulation No 5 of 28 December 2006 on the technical passports of buildings and structures (last amended in SG No 80 of 13 September 2013, in force as of 14 October 2013).

Table 3.1.2-2: *Buildings audited in 2011–2013*

	2011		2012		2013	
	Number	**TFA, m^2 '000**	**Number**	**TFA, m^2 '000**	**Number**	**TFA, m^2 '000**
Municipal buildings	188	535.8	386	1 146.3	280	807.1
State-owned buildings	26	308.3	97	507.3	60	624.7
Public buildings in private ownership	85	560.8	69	430.7	92	555.7
Total	**301**	**1 404.9**	**553**	**2 084.3**	**432**	**1 987.5**

National legislation also requires energy-efficiency inspections and the optimisation of the operation of water boilers and air-conditioning systems in public buildings.

Article 27 of the ZEE requires periodic inspections of water boilers used for heating in public buildings. Depending on the installed capacity and type of energy used, the frequencies of the periodic energy-efficiency inspections of water boiler heating systems are:

- every 4 years for water boiler heating systems running on liquid or solid fuels if the rated capacity of each boiler is 20 to 50 kW inclusive;
- every 3 years for water boiler heating systems running on liquid or solid fuels if the rated capacity of each boiler is 50 to 100 kW inclusive;
- every 2 years for water boiler heating systems running on liquid or solid fuels if the rated capacity of each boiler is over 100 kW;
- every 4 years for water boiler heating systems running on natural gas if the rated capacity of each boiler is over 100 kW. For boilers that have been in operation for more than 15 years, the energy-efficiency inspections include one assessment of the heating system.

According to Article 28(2) of the ZEE, air-conditioning systems with a rated capacity greater than 12 kW must be inspected once every 4 years.

Table 3.1.2-3: *Registered boilers and air-conditioning systems, 2011–2013*

	2011		2012		2013	
	Count	**Installed capacity, MW**	**Count**	**Installed capacity, MW**	**Count**	**Installed capacity, MW**
Water boilers	707	394.2	335	246.7	128	42.7
Air-conditioning systems	228	16.8	84	7.0	264	8.7
Total	**935**	**411.0**	**419**	**253.7**	**392**	**51.4**

According to the ZEE, an 'energy-efficiency audit' is a process based on a systematic method for identifying and quantifying energy flows and usage in buildings and/or industrial systems, which determines the scope of the technical and economic parameters of the energy-efficiency improvement measures.

The energy-efficiency audits of buildings in use establish the levels of energy use, identify specific options for their reduction and recommend measures for improving energy efficiency.

In addition, the implementing regulations of the ZEE set out the minimum criteria for the energy-efficiency audits and the arrangements for ensuring compliance with them.

Regulation No RD-16-301 of 10 March 2014, implementing the ZEE, sets out the main requirements for persons that perform energy-efficiency audits in order to ensure sufficient availability of qualified experts and enable control of the quality of the audits performed.

As regards the policy of promoting energy-efficiency audits in SMEs, there is a proposal for a new Energy Efficiency Act, which provides for the development of schemes aimed at the promotion of energy-efficiency audits in SMEs and the measures recommended as a result of the audits.

Article 5 of the ZEE sets out a requirement for the Director of the AUER to draw up, maintain and publish on the Agency's website a list of financial mechanisms and measures for the promotion of energy efficiency.

3.1.3 METERING AND BILLING (EED ARTICLES 9 to 11)

Electricity

In accordance with the Energy Act, the electricity delivered to final users is measured by commercial metering devices (CMDs) owned by the operator of the transmission network or by the relevant distribution network and situated within or at the boundary of the property. Electricity users may not be charged any fees for the commercial metering devices.

Heat

Typically, two types of internal heating systems are used in Bulgarian multi-family buildings connected to a central heat source:

- vertically distributed systems where the radiators in each apartment are supplied with heat from several points (they receive heat from vertical pipes running from the first to the last floor);
- horizontally distributed systems on each floor, whereby the radiators in each apartment are supplied from a single point (distribution box with integrated heat meter).

In the majority of buildings, the heating systems are Tichelmann-type systems with two pipe circuits and vertical heat distribution. Therefore, the only technical option for metering and allocation of the heat consumed by each residential unit is to install individual heat cost allocators on each radiator.

For buildings with common heat and domestic hot water (DHW) systems, the regulatory framework ensures the transparency and accuracy of individual metering and sets out clear rules for the allocation of heat and DHW costs in multi-family buildings supplied from a central heat source. The established practice is fully compliant with Article 9(3) of the EED.

The Bulgarian rules on the use of individual heat cost allocators for measuring the heat used at each radiator point are consistent with the provisions of Article 9(3) of the EED, which stipulates that:

'*…Where the use of individual meters is not technically feasible or not cost-efficient, individual heat cost allocators shall be used for measuring heat consumption at each radiator,*

unless it is shown by the Member-State in question that the installation of such heat cost allocators would not be cost-efficient.'

The EED recognises individual conditions for measuring heat in multi-apartment and multi-purpose buildings that have a central heat source and vertical piping where the use of individual heat meters would not be technically feasible or cost-efficient.

The legislation provides that, when it is technically feasible, energy consumption should be metered rather than allocated by installing individual allocators. This applies to buildings where the installation of individual heat meters is technically feasible. When existing heat allocators are replaced, they must be substituted with competitively priced individual heat meters, to the extent that this is technically feasible or cost-efficient in terms of the potential savings.

The internal heating systems in the clients' buildings are connected to the heat distribution network by means of a connecting heat pipe and heat exchangers. When a new building is connected to the network, a competitively priced individual heat meter must be installed in each property in the building. When an existing building is connected after major renovation and a change from a vertical internal system to a horizontal one, a competitively priced individual heat meter must be installed in each property in the building.

Natural gas

The operator of the gas transmission network is obliged to ensure that the following arrangements are in place for the purpose of metering natural gas:

1. technical and metrological equipment, development and modernisation of devices for commercial metering of the amount of natural gas that enters and leaves the gas transmission network;
2. a database with CMD readings of the amount of natural gas for the purposes of point 1, as well as the contracts concluded at freely negotiated prices and those concluded on the balancing market.

The owners of the commercial metering devices must provide CMD readings to the operator of the gas transmission network for contracts at freely negotiated prices and those on the balancing market. The parties to natural gas contracts are entitled to receive details from the database about the amounts of natural gas traded between them under these contracts.

Billing

The Energy Act requires the energy companies to provide the users of their energy services with the following types of information:

1. methods of payment, tariffs for disconnection or reconnection of supply, tariffs for maintenance services or other services related to the licensed activity;
2. procedures for switching suppliers and notice that the users of energy services are not charged additional fees when changing supplier;
3. actual consumed quantities and cost of the provided services in accordance with the agreed metering frequency, with no requirement to pay extra for that service;
4. final reconciliation following any change of supplier;
5. the share of each energy source in the overall energy mix from the supplier during the previous calendar year, in an understandable and easily comparable format;
6. existing sources of publicly available environmental impact information at least in respect of the carbon dioxide emissions and radioactive waste generated by the production of electricity from the various energy sources within the supplier's overall energy mix in the previous calendar year;
7. information regarding dispute resolution methods;
8. conditions for the provision of electronic billing information and electronic bills.

The energy or natural gas supplier must provide its clients with a wide choice of payment methods, including advance payment systems that must be fair and adequately reflect the expected consumption. An energy or natural gas supplier is obliged to provide another energy or natural gas supplier with details about the consumption of a domestic client if this is explicitly agreed between the client and the energy or natural gas supplier. The above information must be provided in the bills or in information materials accompanying them and on the websites of the energy companies. In the same way, energy or natural gas suppliers must also provide the users of energy services with a checklist, approved by the European Commission, containing full information about their rights. Billing information must be provided at least once every three months or upon request, or, when the users have chosen to receive electronic bills, twice each year.

To ensure traceability of energy costs and the energy savings levels achieved as a result of the provision of energy services, the ZEE sets out a requirement for the bills of final customers to contain the following information:

1. currently applicable tariffs and energy actually consumed;
2. energy consumption during the current period versus energy consumption in the same period of the previous year;
3. contact details of consumer organisations, energy agencies or other institutions, including websites, where the user can obtain information about the energy-efficiency improvement measures available.

3.1.4 CONSUMER INFORMATION PROGRAMMES AND TRAINING (EED ARTICLES 12 AND 17)

Article 10(4) of the ZEE provides that in order to fulfil their individual targets, energy traders may implement horizontal measures aimed at increasing energy efficiency at the level of final consumers, such as information or promotional campaigns. Efficient energy use by SMEs and households is promoted and facilitated via broad information and training campaigns, establishment of consultation centres at training locations, and public awareness activities in this area. The campaigns address all age groups, including schoolchildren, students, communities and all other citizens. The media also have an enormous role in this respect.

On their websites, electricity distribution companies publish information about energy-saving methods and maintain online archives of electronic bills. The companies engage energy consultants that can help clients reduce their energy consumption without expensive investments and complicated repairs. The specialists trained for this purpose are also able to assist by explaining the regulatory basis of the energy sectors, clarifying various regulations and laws, helping customers understand their electricity bills, or explaining how the price of electricity is calculated and who is responsible.

3.1.5 AVAILABILITY OF QUALIFICATION, ACCREDITATION AND CERTIFICATION SCHEMES (EED ARTICLE 16)

The conditions and procedures for the acquisition and recognition of a qualification in energy-efficiency audits of buildings and industrial systems and in certification of systems are set out in the ZEE. Energy-efficiency audits, certification of buildings, conformity assessments of investment projects and energy-saving assessments are performed by persons registered in public registers maintained by the AUER. The ZEE sets out the requirements for these persons, while detailed provisions are set out in second-level legislation, namely *Regulation No RD-16-301 of 10 March 2014 on the information liable for registration in the registers of persons performing audits and certification of buildings and energy-efficiency audits of industrial systems, the procedure for obtaining information from the registers, the terms and arrangements for the acquisition of a qualification and the technical devices required for the performance of audit and certification activities*.

The qualification required for the performance of energy-efficiency audits and certification of buildings, or of energy-efficiency audits of industrial systems, is obtained following the successful completion of an examination at technical universities accredited in accordance with the Higher Education Act that specialise in the professional domains 'Energy' and 'Electrical engineering', which must be preceded by training at Bulgarian or foreign technical universities.

The professional qualification of persons performing energy-efficiency audits of buildings and industrial systems and certifications of buildings is divided into two levels, where:

1. the holders of a Level 1 qualification possess the competence required to perform energy-efficiency audits of all categories of buildings as per the Bulgarian nomenclature of buildings and structures;
2. the holders of a Level 2 qualification possess the competence required to perform energy-efficiency audits and energy-efficiency certification of: buildings belonging to Category 5 as per the Bulgarian nomenclature of buildings and structures, without limitation; the heating, ventilation, cooling and DHW systems in these buildings and buildings of Category 4 as per the Bulgarian nomenclature

of buildings and structures, provided that such buildings do not have ventilation or cooling systems.

Energy-efficiency consultants are trained in accordance with curricula with a certain minimum mandatory scope. The minimum mandatory scope of the curriculum of specialised training for the acquisition by natural persons of a Level 1 professional qualification for energy-efficiency consultants, in accordance with the requirements of the ZEE, is set out in Annex No 9 to Regulation No RD-16-301 of 10 March 2014. It includes the characteristics and scope of the training curriculum for the activities related to energy-efficiency audits and certification of buildings; conformity assessments of investment projects with an energy-efficiency requirement; and assessments of energy savings in buildings.

The curriculum includes the number of training hours and subjects for each type of academic work that the trainees must complete in order to obtain the key competences needed to perform the activities referred to in point 1 in all categories of buildings – as per the nomenclature of buildings and structures set out in a regulation issued pursuant to Article 137(2) of the Territorial Planning Act (ZUT) – which the ZEE requires to be brought into conformity with the energy-efficiency requirements.

The building categories are defined in accordance with the conditions set out in the ZUT and depend on the characteristics, significance, complexity, specificity and risks associated with the use of the buildings, including the use of the technical systems installed.

The training for a Level 1 qualification encompasses all buildings, covering the various complexities of execution, functional use and operation, as per the 'Nomenclature of public services buildings and facilities and of self-standing public services sites within buildings', as well as all reconstructions, refurbishments, rehabilitations or changes of use of such buildings and facilities, in respect of their energy consumption. Production buildings within the meaning of paragraph 1 of the Supplementary Provisions of Regulation No 1 on the nomenclature of buildings and structures are not included in the scope of Level 1 qualification training.

Table 3.1.5-1: *Academic work as per the curriculum for the acquisition by natural persons of a Level 1 qualification for energy-efficiency consultants, in accordance with the requirements of Article 23(3)(2) of the ZEE*

Type of academic work	Number of training hours
Lectures	75
Practical work – course project	40
Total	**115**

The curriculum is modular and includes a combination of training hours to ensure that the minimum qualification requirements for Level 1 are covered. The technical and regulatory content is divided into three theoretical modules with relevant main and secondary subjects. The training plan also includes a practical module, namely the completion of a course project. The theoretical modules correspond to each activity in Article 23(1) of the ZEE, while the practical module consolidates the training outcomes and focuses on the trainees' ability to comprehend and apply the knowledge acquired during the course.

The curriculum of the training course for the acquisition by natural persons of a Level 2 qualification for energy-efficiency consultants, in accordance with the requirements of the ZEE, includes the number of training hours and subjects for each type of academic work that the trainees must complete in order to obtain the key competences needed to perform the activities referred to in point 1 for Category 5 buildings and structures within the meaning of Article 137(1)(5) of the ZUT, excluding the public services buildings in the same category. The training for the Level 2 qualification encompasses low-rise residential and mixed buildings, villas with a total floor area of less than 1 000 m^2 and all reconstructions, refurbishments, rehabilitations or changes of use of such buildings, in respect of their energy consumption. Production buildings within the meaning of paragraph 1 of the Supplementary Provisions of Regulation No 1 on the nomenclature of buildings and structures are not included in the scope of Level 2 qualification training.

The main and secondary subjects relate to the specific characteristics of the buildings whose energy performance is examined and assessed at Level 1, taking into account:

- the structural and operating specificities of the buildings;
- the specificities of the Bulgarian climate;

- the methods of supply and use of the various types of energy, including renewable energy;
- the specificities of the installed microclimate systems;
- the types of hot water systems installed;
- the technical rules and norms for the assessment of the annual energy consumption of buildings;
- other regulatory specificities and policies.

3.1.6 ENERGY SERVICES (EED ARTICLE 18)

Regulatory mechanisms

The main piece of legislation regulating the provision of energy services is the Energy Efficiency Act. Chapter III, section VI 'Provision of energy services' of the ZEE sets out the main provisions about this process, which concerns legal entities that are companies within the meaning of the Bulgarian Commercial Act or within the meaning of the legislation of another Member State, particularly energy traders and their provision of energy services to energy end-users. The methods for the assessment of energy savings from energy services are set out in a separate Regulation issued under Article 9(2) of the ZEE.

In addition, there is Regulation No RD-16-347 of 2 April 2009 on the conditions and procedure for the establishment and payment of the funds planned under Energy Savings Performance Contracts, which sets out the financial mechanisms for the activities of ESCO contractors.

Financial mechanisms

The Energy Efficiency and Renewable Sources Fund is expected to play a major role in developing the energy services market as a co-financing and guarantee institution for ESCO services contracts.

Good incentives, transparent competition and a level playing field

As mentioned above, the main participants in the national energy services market are ESCO contractors and energy traders.

The objective of the companies that offer ESCO contracts to energy-end users is to implement energy-efficiency activities and measures in buildings and/or industrial systems that will lead to energy savings at the level of final users. The means for repaying the investment and paying the remuneration due to the contractor come from the energy savings achieved. The very mechanism for the execution of contract activities is market-based and encourages competition between ESCO companies. The regulatory basis also stipulates that the investment payback period may not be longer than 10 years.

As regards energy traders, their main drivers for the provision of energy services are mechanisms of the legislation in force, on the basis of which they receive individual energy-saving targets, thus enabling them to provide various energy services to their end-users in order to achieve part (or sometimes all) of their targets. The most commonly offered services are the replacement of existing appliances with efficient modern ones, installation of smart metering and control systems, and the provision of information, typically related to:

- current energy consumption;
- previous and current bills;
- current energy load;
- disruptions to the quality of supply.

The most common energy service for administrative sites and business chains having a larger number of energy-supplied sites and facilities are energy reports containing detailed information about historical consumption, analysis of that information and recommendations for energy management measures to optimise consumption and reduce energy costs.

Energy services markets by sector

- Households:
  - EE audits and certification of buildings;
  - Heating control;
  - Heat regeneration systems;
  - Smart energy metering systems.
- Services:
  - Audit and certification of buildings;
  - EE inspections of water boilers and air-conditioning systems;
  - Smart energy metering systems;
  - Energy management.
- Transport:
  - Fuel economisers and controllers.
- Industry:
  - EE audits of industrial systems;

- EE inspections of water boilers and air-conditioning systems;
- Smart energy metering systems;
- Energy management and monitoring.

Market participants and energy service providers

The country provides a good environment for the provision of energy services and the current market participants and service providers are the following:

- Independent energy-efficiency consultants as per Article 23(4) of the ZEE, i.e. legal entities licensed to perform EE audits and certification of buildings listed in a separate register of the AUER. They conduct their activities on the basis of the Public Procurement Act and contracts with private individuals and companies. These consultants may conclude ESCO contracts.
- Independent energy-efficiency consultants as per Article 34(4) of the ZEE, i.e. legal entities licensed to perform EE audits of industrial systems listed in a separate register of the AUER. They conduct their activities on the basis of the Public Procurement Act and contracts with private individuals and companies, and may conclude ESCO contracts.
- Traders and, in particular, energy traders providing energy services to energy end-users on the basis of written contracts.
- Designers of architectural, structural, WSS, electrical, HVAC, and other building systems operating on the basis of the Public Procurement Act and contracts for the development of designs and bills of quantities.
- Technical implementers of EE measures – technical managers and workers performing various types of construction and installation works, such as the application of insulation and the installation of heating, air-conditioning, electrical and other systems. They carry out the construction and installation activities as general contractors or subcontractors on a contractual basis and following a tender procedure.

3.1.7 OTHER ENERGY EFFICIENCY MEASURES OF A HORIZONTAL NATURE (EED ARTICLES 19 and 20)

The Energy Efficiency and Renewable Sources Fund (FEEVI) was established on the basis of the Energy Efficiency Act (adopted by the 39th National Assembly in February 2004) as a legal entity independent from State institutions. The Fund operates in accordance with the provisions of the ZEE, the ZEVI and the agreements concluded with its donors, and is not a part of the consolidated national budget. The initial capital of the FEEVI was raised entirely from grant contributions. The main donors are the UN Global Environment Fund through the International Bank for Reconstruction and Development (the World Bank) with a contribution of USD 10 million, the Government of Austria with EUR 1.5 million, the Government of Bulgaria with 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.

3.2 ENERGY EFFICIENCY IN BUILDINGS

3.2.1 BUILDING RENOVATION STRATEGY (EED ARTICLE 4)

The national long-term programme for the mobilisation of investments for the implementation of measures to improve the energy performance of buildings is presented in Annex No 2.

3.2.2 OTHER ENERGY EFFICIENCY IN BUILDINGS SECTOR

The decrease in energy consumption and the use of RES energy in the buildings sector are important measures required for the reduction of GHG emissions. The main measures for the improvement of EE in the buildings sector are set out in the following regulatory and strategic documents:

Legislative measures:

1. Measures based on the ZEE:

- Develop a national plan to increase the number of nearly zero-energy buildings (NZEB), including a national definition of NZEB and the criteria they must meet, time span, national targets aimed at increasing the number of NZEB in the various classes of buildings, as well as policies and mechanisms, including financial ones, to promote the construction of this type of buildings.
- Individual energy-savings targets for owners of buildings with a total floor area of more than 1 000 m^2 within the aggregate amount of 521.03 GWh.
- Mandatory certification of public services buildings with a total floor area of more than 500 m^2; after 9 July 2015 the certification threshold will be reduced to 250 m^2.
- After reconstruction, rehabilitation or major renovation of a building in use, the energy performance of the building or of its renovated parts must be improved to a level that corresponds to the minimum energy performance requirements insofar as this is technically feasible and economically justified. Conformity with the energy-efficiency requirements is deemed to have been achieved in the following cases:
  - New buildings under design or construction: when the calculated values of the indicators correspond to Class B in the energy consumption scale;
  - Existing buildings: when the calculated values of the indicators correspond to:
    - at least Class C in the energy consumption scale for buildings commissioned between 1991 and 2009 inclusive;

  - at least Class D in the energy consumption scale for buildings commissioned in 1990 or earlier.

- The energy-saving measures recommended for each reconstruction, rehabilitation or major renovation of a building in use or parts thereof will be assessed in respect of the technical and economic feasibility of the use of alternative high efficiency systems.
- When a building or individual parts of a building are sold or let, the seller/lessor must provide the buyer with the energy performance certificate of the building. The owners of apartments in multi-family buildings are entitled to receive a notarised copy of the energy performance certificate of the building, while the original certificate is kept by the building manager.
- Inspections of heating systems that use water boilers with a rated heating capacity of more than 20 kW and of air-conditioning systems with a rated electric capacity of more than 12 kW in public services buildings, the objective being to establish how efficiently they are operated and to identify efficiency-improvement measures. The inspections consist of:
  - assessment of the conformity of the existing configuration, operation and maintenance;
  - assessment of the actual energy performance;
  - formulation of recommendations for feasible energy performance improvements in order to reduce the use of energy resources and carbon dioxide emissions.
- Management of energy efficiency in buildings.

2. Measures based on the ZEVI:

The ZEVI requires the introduction of systems for the production of energy from RES, when this is technically feasible and economically justified, as part of the construction of new buildings or the reconstruction, major renovation, rehabilitation or rebuilding of existing buildings. This requirement applies to public services buildings as from 1 January 2012 and will apply to all other buildings after 31 December 2014. The analysis of the options for the use of renewable energy is part of the estimation of the annual energy consumption of the building.

In this case, at least 15 % of the building's overall demand for heating and cooling energy must be met by renewable sources though the introduction of:

- a central heating source using biomass or geothermal energy;
- individual biomass combustion equipment with transformation efficiency of at least 85 % in residential or commercial buildings and at least 70 % in industrial buildings;
- solar heat systems;
- heat pumps and ground-connected geothermal systems.

Strategic measures:

1. Measures based on the Second National Energy Efficiency Action Plan (VNPDEE)

The VNPDEE provides for the formulation of a Pilot Programme for public nearly zero-energy buildings. This measure is part of the process of setting a national target for buildings with near-zero consumption. In setting this target, Bulgaria will adhere to the EC's 'two-stage' targeting approach. During the first stage, which fully coincides with the period of the VNPDEE, Bulgaria's basic aim is to define national parameters for nearly zero-energy buildings.

This measure will be implemented by setting national targets and a baseline year against which the achievement of these targets will be measured. Depending on the building categories, this will be done for the periods 2011–2013; 2013–2016 and 2016–2020. The measure will include mechanisms for implementation as well as for the measurement, recording and reporting of the results. Within the framework of this measure, Bulgaria also expects to launch pilot projects for new public nearly zero-energy buildings and report their contribution to the interim 2015 target, and the funding for these projects should be planned in the next programming period, 2014–2020.

3.3 ENERGY EFFICIENCY IN PUBLIC BODIES

3.3.1 CENTRAL GOVERNMENT BUILDINGS (EED ARTICLE 5)

Table 3.3.1-1: *List of heated and/or cooled central government buildings with a total floor area of more than 500 sq m*

Institution	TFA, m^2	Buildings count	Investments required for 3 % of the TFA, BGN
Ministry of Foreign Affairs	23 347.96	13	42 026.33
Ministry of the Interior	1 056 667.03	378	1 902 000.65
Ministry of Health	81 212.18	33	146 181.92
Ministry of Economy and Energy	110 187.54	20	198 337.57
Ministry of Culture	215 187.85	39	387 338.13
Ministry of Youth and Sport	82 687.50	18	148 837.50
Ministry of the Environment and Water	36 735.16	21	66 123.29
Ministry of Defence	897 115.47	314	1 614 807.85
Ministry of Justice	517 004.27	199	930 607.69
Ministry of Regional Development	100 954.75	67	181 718.55
Ministry of Transport, Information Technology and Communications	275 857.17	41	496 542.91
Ministry of Labour and Social Policy	110 235.29	54	198 423.52
Ministry of Finance	227 957.99	111	410 324.38
Ministry of Education and Science	3 787 134.15	1 021	6 816 841.47
Total	**7 522 284.31**	**2 329**	**13 540 114.77**

3.3.2 BUILDINGS OF OTHER PUBLIC BODIES (EED ARTICLE 5)

The obligation for central and local bodies to develop plans to improve energy efficiency and formulate programmes for their implementation is set out in the ZEE. The measure has been implemented in Bulgaria since 2008. At present, the same measure is envisaged in Article 5(7) of the EED in terms of the alternative approach to Article 5 whereby Member States should annually renovate 3 % of the total floor area of heated or cooled buildings owned and used by their central administrations in order to reach at least the minimum requirements for the energy performance of buildings.

The formulation of plans and programmes is crucial to the achievement of the individual energy-saving targets assigned to central and local government bodies in their capacity as owners of buildings with a TFA of more than 1 000 m^2. These plans and programmes must provide for the fulfilment of another obligation set out in Article 36 of the ZEE, namely the management of energy efficiency in public buildings with a TFA of more than 1 000 m^2 (buildings with TFAs of more than 500 m^2 after 2013 and 250 m^2 after 9 July 2015).

Formulating energy-efficiency improvement plans and programmes and managing energy efficiency does not have a direct energy-savings impact, but is the main mechanism for helping the owners of state and municipal buildings achieve their individual energy-savings targets.

In accordance with the ZEE, the national indicative energy-saving target for 2016 is allocated to individual targets among the obligated parties, including the owners of public buildings.

The profile of the obligated owners of public buildings is as follows: 243 municipalities, 28 districts and 15 institutions.

The list of the obligated owners of public buildings and the values of the individual energy-saving targets allocated to them are adopted by the Council of Ministers and annexed to the National Energy Efficiency Action Plan. The individual targets of the owners of government and municipal buildings are set on the basis of their buildings with TFAs of more than 1 000 m^2, in accordance with the legislation in force at the time of defining these targets. After the transposition of Directive 2010/31/EU into national legislation, the TFA threshold was reduced to 500 m^2 (and will be reduced again to 250 m^2 after 9 July 2015). All energy-efficiency improvement measures are eligible to contribute towards the achievement of the individual targets and in certain cases the obligated parties include in their reports on the

implementation of their energy-efficiency plans the measures applied by them in building stock with TFAs below 1 000 m^2.

The achievement of the individual energy-saving targets by the obligated owners of public buildings under Article 12 of the ZEE has been analysed on the basis of the reports on the implementation of energy efficiency plans received by the AUER.

According to the information received from the obligated parties, 1 718 projects were completed in 2013 whereby the applied measures pertained not only to state and municipal buildings but also to other assets such as public street lighting.

3.3.3 PURCHASING BY PUBLIC BODIES (EED ARTICLE 6)

The Sustainable Energy Development Agency and the Public Procurement Agency have jointly developed Guidelines on the application of energy efficiency and energy-saving requirements when awarding public contracts for the supply of equipment and vehicles. In 2010, these Guidelines became an appendix to the Public Procurement Act. The list of the elements and values that contracting authorities may use to define the requirements, as well as the relevant sources of information, are provided in an Annex to the Guidelines.

This is a vital measure, as it provides an obligation for all owners of public buildings to select the most energy-efficient facilities and appliances. Bearing in mind the very large number of such buildings – there are more than 6 400 with a TFA of more than 1 000 m^2 – this measure will lead to significant savings of energy resources and reductions in harmful emissions.

In implementation of this measure, and in accordance with the European Union's policy of sustainable development and awarding public contracts that include environmental requirements, a 'National Action Plan for the Promotion of Green Public Contracts 2012-2014' was developed and adopted in 2012.

The National Plan contains a total of 5 objectives as well as specific activities for the period 2012–2014, some of which are: the development of methodological guidelines on green public procurement; dissemination of good green procurement practices that are applied by the contracting authorities referred to in Article 7 of the ZOP; training of the participants in the process of awarding green contracts; organisation of training for contracting authorities at central level in order to achieve the activities included in the Plan; maintaining a green procurement mailbox (GPP@aop.bg); etc. In addition, the Plan lays down specific public procurement targets for green public contracts expressed as a percentage of all public contracts awarded in 2012–2014.

The green criteria for awarding contracts in the product groups listed in the Plan and the targets for the relevant year are mandatory for contracting authorities at central level.

According to the Public Procurement Register, 59 green procurement procedures were launched in the period to 31 December 2013. These have resulted in the award of 29 public contracts worth a total of BGN 99.129 million. Most of the product groups covered by the green public contracts were copy papers, air-conditioning systems, conventional vehicles and related services.

3.4 OTHER END-USE ENERGY EFFICIENCY, INCLUDING IN INDUSTRY AND TRANSPORT

Industry

In order to achieve its national target under the Climate-Energy package, the country is focusing its efforts on overcoming the high energy intensity of the economy. Another key tool for the reduction of industrial CO_2 emissions is the European Emission Trading Scheme. The main regulatory measures aimed at reducing industrial GHG emissions are:

1. Legislative measures:

Measures based on the ZOOS:

- The obligation for certain industrial enterprises to participate in the GHG allowances trading scheme;
- The application of an integrated approach to the control of emissions from industrial sources on all components of the environment by issuing integrated permits as per Annex 4 to the ZOOS .

2. Strategic measures:

Measures based on the NPDIK:

- Energy-efficiency audits and implementation of the measures prescribed;
- Use of biomass in the combustion plants of the systems;
- Creation of a tech park and business incubator.

Measures based on the NPDEVI:

- The current regulatory framework does not support the production of energy for low-temperature processes (heating, cooling, drying, etc.). The MIE and the DKEVR will develop a scheme to support the use of RES in the industrial sector, where the main condition for the provision of support will be the capture and utilisation of heat released from cooling processes in combination with other energy-efficiency measures. The measure is ongoing and will continue until 2020.

Measures based on the VNPDEE:

- Develop public-private partnerships for the implementation of EE measures;

- Set up a permanent intra-institutional working group within the MIE, responsible for the sectoral policy in the Industry sector;
- Fund energy-saving and RES projects under Operational Programme 'Development of the competitiveness of the Bulgarian economy 2007–2013' with a total amount of BGN 371.6 million:
  - Procedure BG161PO003-2.3.01 'Investments in green industry' is being implemented. Its main objective is to provide investment support to large enterprises in Bulgaria, in order to overcome their adverse environmental impact, through the promotion of projects directly related to the reduction of their energy and resource intensity as a key factor for fostering the competitiveness and sustainable development of large enterprises in Bulgaria. There are 28 grant agreements being implemented. A further 30 agreements have been concluded with a total amount of BGN 154 878 295, in which the grant component is BGN 77 141 826. At the end of June 2014, 20 agreements were being implemented, A further 8 projects have been completed and have received payments in the amount of BGN 16 605 887.
  - Procedure BG161PO003-2.3.02 'Energy efficiency and green economy' is being implemented. Its main objective is to provide investment support and advice to Bulgarian micro-, small and medium-sized enterprises in their transition to a green economy by promoting the implementation of projects directly related to the introduction of energy-saving technologies and renewable energy sources, technologies leading to the reduction of the energy intensity of production processes as well as measures for the improvement of processes and energy management within the enterprises. This will contribute to their sustainable development and to the reduction of adverse environmental impacts. In one process, the procedure combines a grant component (non-repayable aid) and a loan component – additional funding of BGN 293.37 million provided by the European Bank for Reconstruction and Development in the form of credit lines to local commercial banks, which provide loans to small and medium-sized enterprises participating in the grant scheme. The number of agreements signed by 25 June 2014 was 441, providing total grant aid of

BGN 273.8 million. A total of 60 projects have been completed and have received payments in the amount of BGN 14 509 786.

Transport

Transport is the sector where energy use is the greatest, exceeding that of the industrial sector. The growing energy demand is driven by the rapidly increasing number of vehicles and their annual mileage, which comes at the expense of a decrease in the use of the more energy-efficient rail transport. In the coming years, transport will require special attention, effort and measures to mitigate rising energy consumption and GHG emissions.

1. Legislative measures:

Measures based on the ZOOS:

- The ZOOS requires the suppliers of liquid transport fuels to reduce GHG emissions per energy unit of liquid fuels delivered against a fixed baseline level and reach an overall reduction of 6 % by 31 December 2020,. which will improve the energy efficiency of this sector.

Measures based on the ZEVI:

- The ZEVI requires the suppliers of petroleum-derived liquid transport fuels to supply fuels for diesel and petrol engines blended with biofuels in certain proportions.

2. Strategic measures:

Measures based on the NPDIK:

- Rehabilitate and modernise the road infrastructure in order to allow for optimal travelling speeds and ensure that vehicle engines operate in the optimum mode;
- Introduce intelligent transport systems on national roads and in urban environments;
- Increase the share of biofuels;
- Reduce the relative share of trips with private motor vehicles by improving public urban transport and promoting non-motorised transport;
- Develop and promote the use of bicycles;
- Increase the share of electrified urban transport by rail, metro, trolleybuses and tramcars;

- Develop and build intermodal terminals for multimodal services;
- Develop and promote the use of hybrid and electric vehicles;
- Ensure that fiscal policy stimulates savings and less use of conventional fuels;
- Reduce the number of urban transport vehicles using conventional fuels by 2020;
- Reduce the freight transported more than 300 kilometres by road vehicles by changing it to more environmental modes of transport, including rail;
- Build railway connections between the central airport hubs of Sofia, Varna, Burgas, Plovdiv and Gorna Oryahovitsa;
- Sustainable transport statistics;
- Informed vehicle choices;
- Training in energy-efficient driving.

Measures based on the NPDEVI:

- Promote the production of biofuels and require state and municipal administrations to provide examples of good practices in the implementation of energy-efficiency measures and RES use in the transport sector. When launching public procurements for new vehicles, municipalities should require the engines of the vehicles to be able to run on blended and pure biofuels.
- Establish a support scheme for transport operators where there are significant differences between the prices of conventional fuels and biofuels, following an analysis and assessment of the economic and environmental benefits from the use of biofuels.
- Improve the mechanisms for the promotion of the use of biofuels, including second-generation biofuels, subject to the sustainability criteria, and take into account the specific characteristics of the entire process, from growing the primary materials to the use of the biofuels in the transport sector.
- Increase the number of electric vehicles and the individual systems for production of electricity from RES in the transport sector by constructing and developing smart grids and electric vehicle charging stations. According to the report on the implementation of the National action plan for the promotion of the production and accelerated penetration of ecological vehicles, including electric mobility, adopted by the Council of Ministers on 11 June 2014, the total

number of purely electric vehicles had risen by 61 % by 31 December 2013, while the number of hybrids had increased by 119 % in one year (new registrations of 366 electric and 586 hybrid vehicles). The priorities for 2014 are mainly related to expanding the charging infrastructure.

Measures based on the VNPDEE:

- The implementation of the measure 'Development of rail infrastructure, improvement of inland waterways navigation and expansion of metro transport' will begin in 2014. The measure aims to create conditions for the priority development of energy-efficient modes of transport and includes the implementation of rail, inland waterways and metro projects under the Operational Programme 'Transport and Transport Infrastructure 2014–2020'. Another measure in this sector, 'Requirements for purchasing EE vehicles for the public sector and for the public transport sector', will also be launched in 2014.
- The measure concerns the development of a regulatory framework laying down the minimum EE requirements for purchasing EE vehicles for the public sector and for the public transport sector, while the resources required for its implementation amount to BGN 56 million. The savings expected from the implementation of this measure by 2020 are estimated at 326 GWh/y (28 000 toe/y).

3.5 PROMOTION OF EFFICIENT HEATING AND COOLING

3.5.1 COMPREHENSIVE ASSESSMENT (EED ARTICLE 14)

Nearly 95 % of all cogeneration plants are between 20 and 36 years old. There are currently in service 12 turbine generators with a capacity of 6 to 12 MWel, mainly counter-pressurised; 9 turbine generators with a capacity of 25 to 30 MWel; and 6 turbine generators with a capacity of 50 to 66 MWel.

The new cogeneration systems installed in the last 2 to 3 years have an overall capacity of 32 MWel and use gas-piston engines of limited output (0.4 to 3.3 MWel). Most of them are second-hand and have electrical efficiency of more than 38 %.

There are 4 central heating plants, with an overall capacity of 333 MWel, that are run on imported and local coal. The 105 MWel plant in Pernik burns local coal (ash content up to 65 %). The remaining plants are run on natural gas.

The Analysis of the national potential for the use of HECG for heat and electricity, made in 2010, established that 50.6 % of the existing combined heat and power plants may be regarded as being highly-efficient in terms of their electrical output. Therefore, a high-efficiency rate can be achieved by modernising existing plants and closing the inefficient ones. The investment plans intend to modernise or rebuild around 10 % of the existing plants during the period 2010–2015 and 55 % in the period 2015–2020, after which time only the highly-efficient plants will remain in service.

Cogeneration plants with an installed capacity of less than 1 MW are developed mainly in the food and healthcare sectors and the number of such plants is expected to increase five-fold by 2020.

A major market exists for plants in the centrally heated areas. The most appropriate approach in these cases is the construction of high-efficiency cogeneration plants with steam-gas module and heat accumulators, which will increase their operational period to 8 000 hours/y. The results from the investment analysis demonstrate that this approach can accomplish an internal rate of return between 16 % and 19 % and primary energy savings of around 20 %.

Combined heat and power from renewable sources is examined separately due to available preferences, which has led to a realisation of its increasingly useful potential. This is primarily related to the economic and environmental efficiency of the plant rather than to the plant's capacity to meet a certain demand for heat. Biomass has the largest share among all renewable sources and it is accordingly considered in the assessment of the potential for combined heat and power generation, specifically in terms of its potential as a primary energy resource in the regions and in the country as a whole.

The potential for useful cold generation is examined as complementary to the useful heat potential as it can improve the economic efficiency of the plants by increasing their utilisation throughout the year. Cooling in Bulgaria has a secondary role at present and is applied only in specific cases such as certain manufacturing processes, healthcare buildings and buildings in the services sector.

Bulgarian legislation provides for the development of:

1. a comprehensive assessment of the potential for highly efficient heat and power cogeneration and of efficient regional heating and cooling systems;
2. cost-benefit analysis projects to identify the most economically efficient and profitable heating and cooling option, where the analysis may be part of the environmental assessment of the programme and of any projects under it;
3. analysis of the national potential as part of the comprehensive assessment and evaluation of the progress achieved in increasing the share of high-efficiency cogeneration in the gross consumption of electricity;
4. measures for the development of an efficient heating and cooling infrastructure and/or for supporting the development of combined heat and power and the use of heating and cooling energy generated from waste heat and renewable energy sources, in accordance with the assessment and analysis.

The legislation requires municipal mayors, in cooperation with province governors, to develop forecasts for the consumption of electricity, heat and natural gas as well as programmes and plans for electricity, heat and gas supply within the territories of their municipalities. The information sources used for this purpose are investment projects related to sites of energy users and producers, the provisions of town and country planning schemes and the production and consumption forecasts developed by energy companies and stakeholders.

Province governors and municipal mayors develop regional and local programmes in order properly to assess the potential for the use of efficient heating and cooling systems and high-efficiency cogeneration systems, as well as the potential for the development of local and regional energy markets.

3.5.2 OTHER MEASURES FOR EFFICIENT HEATING AND COOLING (EED ARTICLE 14)

Directive 2004/8/EC of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market has been transposed into Bulgarian legislation, which supports the development of cogeneration.

In 2008, in accordance with its obligation pursuant to Articles 6 and 10 of Directive 2004/8/EC, Bulgaria submitted to the Energy Committee of the Directorate-General for Energy and Transport of the EC an 'Analysis of the national potential for high-efficiency cogeneration of heat and electricity in the Republic of Bulgaria'. Every four years and following a request from the Commission, Member States are also required to submit evaluations as per Article 6 of Directive 2004/8/EC. Bulgaria submitted its preliminary evaluation in March 2010.

The national policy for the support of high-efficiency cogeneration of heat and electricity has been developed on the basis of Directive 2004/8/EC of the European Council and of the Parliament of 11 February 2004 and is set out in the Energy Act, the Regulation on the establishment of the quantity of electricity produced from combined generation of heat and electricity and the Regulation on the issuance of certificates of origin for the electricity produced by cogeneration methods.

3.6 ENERGY TRANSFORMATION, TRANSMISSION, DISTRIBUTION AND DEMAND RESPONSE

3.6.1 ENERGY EFFICIENCY CRITERIA IN NETWORK TARIFFS AND REGULATION (EED ARTICLE 15)

The proposed new Energy Act will introduce an obligation for the assessment of the energy-efficiency potential of gas and electricity infrastructure and for the formulation of concrete measures, investments and implementation schedules to improve their energy efficiency. The assessment includes, among other things, an analysis of the transmission, distribution, load management and efficient functioning of the systems, and options for the connection of decentralised power plants. The assessment will serve as a basis for the formulation of concrete measures and investments aimed at improving the energy efficiency of gas and electricity infrastructure as well as implementation schedules.

In exercising its regulatory power the DKEVR is guided by the principles of promoting the improvement of energy efficiency in the transmission and distribution of electricity and natural gas and creating stimuli for the operators of transmission and distribution networks to provide system services to end-users which enable them to implement energy-efficiency improvement measures by introducing smart grids, taking into account the costs and benefits associated with each measure and making sure that the security of the system is ensured.

The DKEVR sets the electricity transmission and distribution tariffs in order to promote the improvement of energy efficiency in the production, transmission, distribution and supply of energy and to ensure the inclusion of demand response in market balancing and in the provision of additional services. They also aim to reflect in the network tariffs the network cost reductions achieved by users, the demand response, the decentralisation of production, the reduction of supply or investment costs and the cost reduction achieved through the optimisation of network operations. Electricity transmission and distribution tariffs should enable electricity suppliers to strengthen the involvement of final customers in the improvement of the efficiency of the electricity system by optimising their consumption.

The operators of transmission and distribution networks or final suppliers are encouraged to provide system services in the area of optimisation and management of the use of electricity and decentralised production in the framework of organised electricity markets, and in particular by:

1. encouraging end-users to transfer their loads from peak to off-peak hours, taking into account the availability of energy from renewable sources, electricity from cogeneration plants and that from decentralised plants;
2. saving energy by optimising the consumption of decentralised end-users by means of energy clustering;
3. reducing consumption by means of energy-efficiency measures implemented by providers of energy services;
4. connecting and dispatching electric power plants producing electricity at lower voltage levels;
5. connecting and dispatching electric power plants situated closer to consumption points;
6. storing energy.

3.6.2 FACILITATE AND PROMOTE DEMAND RESPONSE (EED ARTICLE 15)

The legislation provides for the introduction of dynamic tariffs as a measure for the final clients to optimise their electricity use by means of:

1. tariffs that take into account the period in which energy is used;
2. tariffs for the critical peak-load periods;
3. pricing in real time;
4. discounts for reducing the use of energy during peak-load periods.

3.6.3 ENERGY EFFICIENCY IN NETWORK DESIGN AND REGULATION (ARTICLE 15 OF THE EED)

In accordance with national legislation:

1. The regulator assesses the energy-efficiency potential of gas and electricity infrastructure and formulates concrete measures, investments and implementation schedules to improve their energy efficiency. The assessment includes, among other things, an analysis of the transmission, distribution, load management and efficient functioning of the systems, and options for the connection of decentralised power plants.
2. The assessment referred to in point 1 serves as a basis for the formulation of concrete measures and investments aimed at improving the energy efficiency of gas and electricity infrastructure as well as implementation schedules.

ANNEX 1: CONVERSION FACTORS AS PER ANNEX IV OF THE EED

Energy commodity	kJ	Kgoe	kWh
1 kg coke	28 500	0.676	7.917
1 kg hard coal	17 200 – 30 700	0.411 – 0.733	4.778 – 8.528
1 kg brown coal briquettes	20 000	0.478	5.556
1 kg black lignite	10 500 – 21 000	0.251 – 0.502	2.917 – 5.833
1 kg brown coal	5 600 – 10 500	0.134 – 0.251	1.556 – 2.917
1 kg oil shale	8 000 – 9 000	0.191 – 0.215	2.222 – 2.500
1 kg peat	7 800 – 13 800	0.186 – 0.330	2.167 – 3.833
1 kg peat briquettes	16 000 – 16 800	0.382 – 0.401	4.444 – 4.667
1 kg residual fuel (heavy oil)	40 000	0.955	11.111
1 kg light fuel oil	42 300	1.010	11.750
1 kg motor spirit (petrol)	44 000	1.051	12.222
1 kg paraffin	40 000	0.955	11.111
1 kg liquefied petroleum gas	46 000	1.099	12.778
1 kg natural gas	47 200	1.126	13.10
1 kg liquefied natural gas	45 190	1.079	12.553
1 kg wood (25 % humidity)	13 800	0.330	3.833
1 kg pellets/wood bricks	16 800	0.401	4.667
1 kg waste	7 400 – 10 700	0.177 – 0.256	2.056 – 2.972
1 MJ derived heat	1 000	0.024	0.278
1 kWh electrical energy	3 600	0.086	1

ANNEX 2: NATIONAL LONG-TERM PROGRAMME FOR THE MOBILISATION OF INVESTMENTS IN THE IMPLEMENTATION OF MEASURES TO IMPROVE THE ENERGY PERFORMANCE OF BUILDINGS

1. OVERVIEW OF THE NATIONAL BUILDING STOCK

The construction sector in Bulgaria has an especially important role to play in addressing the impacts of global climate change through the application of energy-efficiency improvement measures and by defining the quality of the living and working environment. The construction sector has a structural role in the Bulgarian economy as it creates nearly 7 % of the national GDP and provides employment for more than 5.5 % of the economically active population. More than 40 % of investments in long-term assets are concentrated in the construction industry. The sector has a decisive role in national competitiveness and attracting foreign investment. However, at the same time, it is strongly fragmented, as more than 96 % of the industry is represented mainly by micro- and small enterprises.

In Bulgaria, the construction industry was among the sectors most severely affected by the global financial and economic crisis. According to the national statistics, in the period 2008–2011 the value of completed construction works almost halved, from BGN 21 billion to BGN 12.8 billion, while the Construction sector as a whole declined by more than 47 % as compared to pre-crisis levels.

The market decline continued in the first half of 2012, as seen from the key macroeconomic indicators: 6.3 % of the gross value added was formed; employment was as low as 184 000 (against 297 700 in 2008 and 198 400 in 2011); and, according to final data, output was up 1.1 % on the first 6 months of 2011, resulting from 9.3 % growth in building and construction which was offset by a 7.9 % decline in civil construction.

1.1 HOUSING

Households are the third largest energy user, with practically invariable consumption of around 2.1–2.2 Mtoe/y. The sector's share of final energy consumption (FEC) also remains constant at 25-26 %.

Energy use per housing unit grew from 0.553 toe/unit in 2007 to 0.567 toe/unit in 2009, mainly due to the rapid rise in electrical energy consumption. The main drivers of this growth are the larger sizes of new homes, the higher levels of heat and light, the penetration of air-conditioning systems and the growing use of electrical domestic appliances and electronic devices. The unresolved problems in the household sector continue to be the low efficiency of domestic stoves and fireplaces run on wood and coal, as well as underdeveloped household gasification. Energy efficiency is an increasingly important problem in the housing sector: on the one side, energy prices weigh heavily on household budgets and, on the other, there is the global endeavour to save energy in the context of sustainable development efforts, since heating accounts for nearly 70 % of household energy consumption.

A priority of the National Renovation Programme for Residential Buildings in Bulgaria 2006–2020 are multi-family residential buildings. The average energy savings expected from the implementation of the energy-efficiency measures included in the Programme are in the region of 25-35 kWh/m^2 TFA/y. Taking into account the contribution of the replacement of heat substations, the expected savings from the package of measures are about 35.5 % of the actual energy consumption before renovation, subject to compliance with the requirements for maintaining the normative/regulatory parameters of the microclimate in living areas.

Project BG161PO001-1.2.01-0001 'Energy renovation of Bulgarian homes' was launched in July 2012 with the financial support of Operational Programme 'Regional Development 2007–2013', which is co-financed by the European Union through the European Regional Development Fund. The project extends to 36 urban centres and will continue for three years (2012–2015).

The overall objective of the project is to provide better living conditions for citizens in multi-family buildings in urban centres by improving the quality of the living environment and implementing energy-efficiency measures.

The specific beneficiary of the project is the Housing Policy/Housing Renovation Directorate, which forms part of the specialised administration of the MRRB/MRR.

Specific objectives:

Implement energy-efficiency measures in multi-family buildings in 36 urban centres in order to:

- improve the energy efficiency of multi-family buildings;
- extend the physical and social lifespan of the buildings while significantly increasing performance parameters and quality of living;
- create a living environment conducive to sustainable development.

Residential buildings with at least three floors and six or more individual residential units are eligible under the project.

Although the housing stock in Bulgaria is relatively new (about half of the buildings were built in the last 40 years and only 3.9 % before 1919), the buildings are not in good condition and tend to deteriorate, mostly due to insufficient maintenance and inadequate management on the part of owners.

1.2 PUBLIC BUILDINGS

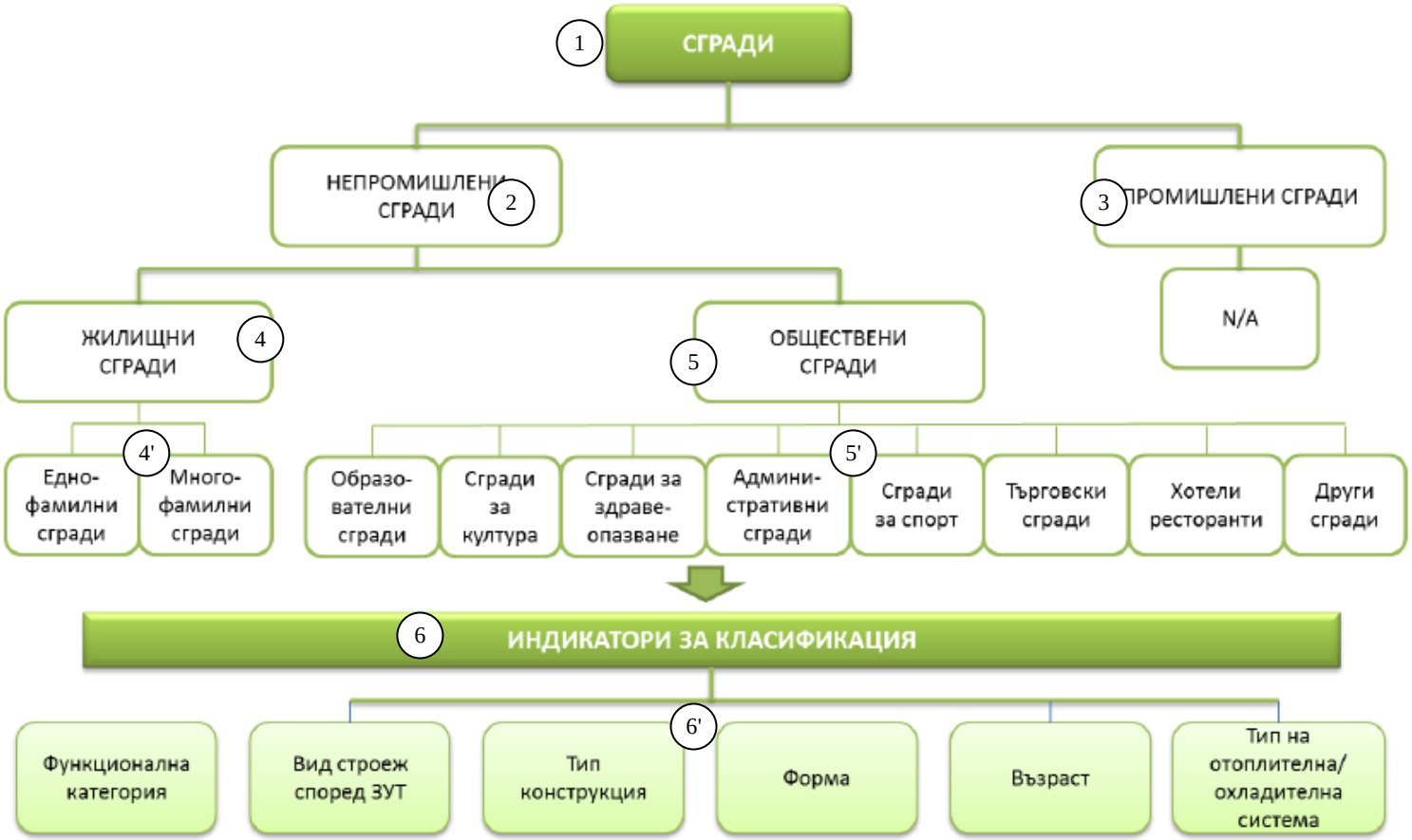
As regards administrative buildings in Bulgaria, the analysis revealed that 38 % of them were built and commissioned between 1959 and 1977, i.e. they were designed in accordance with the norms prevailing in 1959. The remaining 62 % of these buildings were designed and built to the norms applicable between 1974 and 1986. A noteworthy fact is that as little as 5 % of all administrative buildings were designed and built in the period 1999–2005, i.e. at the time when Bulgarian legislation was in the process of full harmonisation with the body of EU law.

2. FORMULATION OF ECONOMICALLY EFFICIENT APPROACHES TO IMPROVING THE ENERGY PERFORMANCE OF BUILDINGS, TAKING INTO ACCOUNT THE BUILDING TYPES AND THE CLIMATE ZONE

According to national energy efficiency legislation, the consumption of energy to maintain the quality of a building's microclimate and living conditions is a function of its properties as an integrated dynamic system and of the search for economically viable solutions to reduce energy costs. Accordingly, the unconditional application of a systemic approach is required. Solutions are sought by taking into account the fact that energy consumption is interrelated with:

1. the functional use, orientation, dimensions and shape of the building;
2. the characteristics of the building's enclosing structures, elements and inner spaces, including thermal and optical characteristics, air tightness, moisture resistance and water tightness;
3. heating and domestic hot water systems;
4. cooling systems;
5. ventilation systems;
6. lighting systems;
7. passive solar systems and shading systems;
8. natural ventilation;
9. systems for the use of energy from renewable sources;
10. external and internal climatic conditions.

The general classification of the buildings is developed in accordance with Regulation No 1 on the nomenclature of buildings and structures in Bulgaria. The classification is presented below:



Key: 1 – Buildings; 2 – Non-industrial buildings; 3 – Industrial buildings; 4 – Residential buildings; 4' *left to right*: Single-family buildings; Multi-family buildings; 5 – Public buildings; 5' *(left to right)* – Education, Culture, Healthcare, Administrative, Sport, Commercial, Hotels & Restaurants, Other; 6 – Classification criteria; 6' *(left to right)* – Functional category, Type of building/facility as per the ZUT, Type of structure, Shape, Age, Type of heating/cooling system.

The cost-optimal analysis is made from a 'micro'-economic perspective. This means that the cost estimate is made at 'financial level' and includes a determination of a cost structure for 'typical' users, taking into account the specific type of reference buildings and the prices paid by the end user. In addition, value added tax (VAT) is excluded from 'financial level' calculations for all cost categories, since in this particular global cost calculation for the purpose of determining the energy performance of buildings, Bulgaria does not apply VAT-based subsidies or promotional measures.

The 'overall costs' approach was used, meaning that for each measure/package/variant that was applied to a reference building, the full costs for major renovation, in accordance with their essential energy efficiency requirements and subsequent use, were calculated.

The following cost categories were assessed in accordance with paragraph 4 of Annex 1 to Commission Delegated Regulation (CDR) (EU) No 244/2012 of 16 January 2012 supplementing Directive 2010/31/EU of the European Parliament and of the Council 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:

a) initial investment costs;
b) running costs (these include costs for operation, maintenance and periodic replacement of building components);
c) energy costs that reflect overall energy costs, including energy price, capacity tariffs and grid tariffs;
d) disposal costs.

The global costs, presented as a net present value for each reference building, were calculated in accordance with the general principles set out in Article 4(2) of Regulation (EU) No 244/2012:

- The change in energy prices was analysed in accordance with Annex II to the Regulation for crude oil, gas and electricity, starting with the average absolute energy prices for these energy sources in the year of the calculations, as well as the changes in these sources (most frequently used), established by retrospective analysis and national forecasts whenever data from national sources is available;
- The effect of the expected future changes in the prices relevant to non-energy costs was taken into account. These are costs for the replacement of building components

during the calculation period, as well as disposal costs, which are also included in the calculation. Price developments, including those due to innovation and adaptation of technologies, have to be taken into account when the calculations are reviewed and updated;

- The figures for the cost categories described above are based on their Bulgarian market levels and are expressed as real prices net of inflation;
- To the extent that the Regulation provides for their exclusion, the following costs are not included in the calculation of the global price of a measure/package: those that are invariable across all measures/packages assessed; and those related to building components that do not influence the building's energy performance. On the other hand, the purpose of the calculations is to compare the relevant measures/packages/variants rather the global costs of the developer and the user of the building;
- The residual value is determined by linear depreciation of the initial investment discounted to the beginning of the calculation period. The depreciation period is determined by the economic lifecycle of the relevant component of the building;
- Disposal costs are discounted to the beginning of the calculation period;
- The residual value of the elements and the building components is taken into account to determine the global costs during the predicted economic lifecycle of the building;
- The initial calculation year is 2013, i.e. the year in which the calculation is made (as required by Article 3(2) of CDR (EU) No 244/2012);
- The calculation period for residential, public and commercial buildings is 30 years;
- The calculations are made in accordance with the comparative methodology framework set out in Article 3 of CDR (EU) No 244/2012;
- For the purposes of the calculations, the comparative methodology framework is supplemented with primary energy conversion factors for the energy commodities relevant to the conditions of Bulgaria;
- Due to their variable nature, subsidies and stimuli for investments in the energy efficiency of buildings are excluded from the calculations;
- The national definitions, as included in laws and regulations on the energy efficiency of buildings, are updated and aligned with those in Directive 2010/31/EC, CDR (EU) No 244/2012 and the set of European standards applicable to their implementation;

- The review of prices and their trends takes into account technology levels – from the most widespread to the most advanced technologies;
- The global costs are calculated in accordance with standard EN 15459, recommended by the Regulation and transposed in 2008 as Bulgarian standard BDS EN 15459 'Energy performance of buildings. Procedure for the economic assessment of energy systems in buildings'.

The measures adopted include construction products and materials, systems and technologies corresponding to the present achievements in respect of thermal and optical performance levels, quality, reliability and sustainability, which are applicable to the construction of new buildings and the renovation of existing buildings.

Similarly, measures were also adopted to improve the efficiency of the systems responsible for maintaining the internal microclimate of buildings. The energy-saving measures are based on state-of-the-art technologies enabling efficient solutions for the generation, transmission, distribution and use of heating, cooling and electrical energy, and the utilisation of energy from renewable sources and biomass.

3. THE STATE POLICY IN THE AREA OF TECHNICAL REGULATION AND HARMONISATION OF ENERGY-EFFICIENCY LEGISLATION FOR THE BUILDINGS SECTOR

Bulgaria's energy efficiency policy in the building sector is implemented by the MRR, the MIP and the MIE. The Bulgarian legislation incorporates the requirements of Directive 2002/91/EC on the energy performance of buildings and, subsequently, Directive 2010/31/EU, Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Directive 2006/32/EC on energy end-use efficiency and energy services, Directive 89/106/EEC on the approximation of laws, regulations and administrative provisions of the Member-States relating to construction products, respectively Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, the New Approach Directives and the standards falling within their scope, as well as technical norms, methods and principles of good European practices.

The national legislation in the area of energy efficiency includes: the Energy Efficiency Act, the Territorial Planning Act, the Energy Act, the Energy from Renewable Sources Act, the Technical Requirements for Products Act, the National Standardisation Act and their implementing provisions.

Evolution of the national requirements for the energy performance of buildings

The process of regulating the technical norms on the design of the thermal insulation of buildings, building services and the characteristics of the construction products used began in the 1960s. Since 1999, the energy requirements for buildings have been continually updated and improved on the basis of the European technical standards, norms and calculation methods.

The transposition in 2004 of Directive 2002/91/EU on the energy performance of buildings by the ZEE and the secondary legislation in the area of energy efficiency was a new beginning in the development of the national energy efficiency rules, with the definition of integrated energy performance indicators and acceptance of the concept that buildings

should be regarded as integrated systems, in which energy use is assessed as the product of the combined impact of the following main components:

- enclosing structures and elements;
- systems responsible for maintaining microclimate parameters;
- internal heat sources;
- inhabitants;
- climatic conditions.

The audits and certifications of existing buildings as well as the energy performance calculations are made on the basis of reference values (fixed in the regulatory documents applicable in the year in which the building was commissioned) for the thermal properties of the enclosing structures and elements of the building and for the efficiency of the elements and machines used in the heating, cooling, ventilation and DHW systems.

The following table provides an example of the evolution of the normative requirements for the enclosing structures, which are one element of the heat and energy balance of the building as per the new concept of annual energy demand.

Table P2.3-1: *Evolution of the normative requirements for the enclosing structures*:

Year	1964	1977	1980	1987	1999	2005	2009**
U walls, W/m^{2}K	1.75	1.75	1.36	1.11	0.50	0.50	0.35
U windows, W/m^{2}K	2.65	2.65	2.65	2.65	2.65	2.0	1.7
U roof*, W/m^{2}K	1.23	1.23	1.087	0.603	0.30	0.25	0.28
U floor, W/m^{2}K	1.15	1.15	0.725	0.503	0.50	0.40	0.40

Notes: The values are for θ_e = -12° and for monolithic buildings with brick walls;
* The values are for flat roofs without lofts;
** Maximum permissible values until 2005 and reference values after 2009. Since 2009 the main criterion for conformity with the national energy-efficiency requirements is the integrated energy performance of the building EP, kWh/m2/y.

The following classification of the buildings is adopted for energy demand and energy performance calculations:

- Residential buildings, including single-family houses, low-, medium- and high-rise residential buildings (apartment blocks), mixed;
- Non-residential buildings, including those for administrative services – administrative, office, official and other buildings; education buildings – schools, kindergartens, etc.; healthcare buildings – various types of inpatient establishments and others; hospitality buildings – hotels, motels, hostels, etc.; retail buildings – shopping malls, markets, bazaars, stores, etc.; public catering buildings – eating places, restaurants, etc.; sport buildings; other public-use buildings in the area of culture, art, transport, etc.

The objective of energy performance calculations is to: establish energy consumption, energy savings and heat preservation in buildings; establish the building's level of energy efficiency; assess the conformity of investment projects in buildings, the issue of energy passports and certification of buildings.

The national methodology for calculating the energy demand and performance of buildings is developed on the basis of BDS EN ISO 13790 and the good European practices for establishing the annual energy demand for heating, ventilation, cooling and hot water. The single methodology for the establishment of energy-demand parameters and for the calculation of the integrated energy performance of buildings was updated in 2010 and currently includes:

1. the functional use, orientation, dimensions and shape of the building;
2. the characteristics of the building's enclosing structures, elements and inner spaces, including thermal and optical characteristics, air tightness, moisture resistance and water tightness;
3. heating and domestic hot water systems;
4. cooling systems;
5. ventilation systems;
6. lighting systems;
7. passive solar systems and shading systems;
8. natural ventilation;
9. systems for the use of energy from renewable sources;
10. external and internal climatic conditions.

The baseline values of the climate factors are determined for nine climate zones of Bulgaria.

The indicators describing the energy demand of buildings are divided into three main groups:

- Group I: Indicators that characterise the energy-transformation and energy-transmission properties of the enclosing elements and the microclimate systems;
- Group II: Indicators that characterise the energy demand of the heating, cooling, ventilation and DHW processes;
- Group III: Indicators that characterise the energy demand of the building as a whole.

The rules for the establishment of energy-demand classes A to G and for the assignment of each building to a relevant class are set out in the legislation. The scale of energy demand classes is built on the basis of two integrated energy performance values, EPmax, r, and EPmax, s, expressed as primary energy or demanded (input) energy, or as carbon dioxide emission savings, as follows:

1. EP max, r, is the total specific energy demand for heating, cooling, ventilation, hot water and lighting calculated using the national methodology, where the values of the thermal properties of the enclosing structures and elements of the building and the efficiency values of the elements and machines used in the heating, cooling, ventilation and DHW systems are those established in accordance with the regulatory documents in force at the time of the assessment;
2. EP max, s, is the total specific energy demand for heating, cooling, ventilation, hot water and lighting calculated using the national methodology, where the values of the thermal properties of the enclosing structures and elements of the building and the efficiency values of the elements and machines used in the heating, cooling, ventilation and DHW systems are those established in accordance with the regulatory documents in force at the time the building was commissioned.

The energy-efficiency indicators used to design buildings and assess the conformity of the designs with the energy efficiency requirements are:

1. Total annual energy demand for heating, cooling, ventilation, hot water, lighting and appliances per square metre of the total heated area of the building (Af) in m^2, expressed as input energy and as primary energy: for new buildings where

the design contract or specification requires the designing of a common heating system for the building;

2. Total annual energy demand for heating, cooling, ventilation, hot water, lighting and appliances per square metre of the total heated area of the building (Af) in m^2, expressed as net energy: for new buildings where the design contract or specification requires the designing of a local heating system or for buildings with structures that do not allow the installation of a central heating service or a common heating system;
3. Total annual energy demand for heating, cooling, ventilation, hot water, lighting and appliances per square metre of the total heated area of the building (Af) in m^2 or per cubic metre of the heated space (Vs) in m^3, expressed as net energy: for existing buildings where standards require an ambient temperature of over 15 °C and a relative humidity of less than 70 %.

The reference value for a particular building is calculated in accordance with the methodology by replacing the reference values of the enclosing structures and those of the elements and machines of the building's microclimate systems. The 2009 reference values of the enclosing structures and elements are the same for both new and existing buildings.

The building is deemed compliant with the energy efficiency requirements in the following cases:

1. New buildings in the process of design or construction: when the calculated values satisfy the criteria for Class B in the energy consumption scale;
2. Existing buildings: when the calculated values satisfy the criteria for:
   a) at least Class C in the energy consumption scale – for buildings commissioned between 1991 and 2009 inclusive;
   b) at least Class D in the energy consumption scale – for buildings commissioned in 1990 or earlier.

4. CREATING A FINANCIAL FRAMEWORK FOR GUIDING THE INVESTMENT DECISIONS OF INVESTORS, BUILDERS AND FINANCIAL INSTITUTIONS

4.1 NATIONAL GREEN INVESTMENTS SCHEME – NATIONAL TRUST ECOFUND

The National Trust EcoFund was established in October 1995 by the Debt-for-Environment swap agreement between the Government of the Confederation of Switzerland 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 Debt-for-Environment and Debt-for-Nature swaps, from international trade in GHG assigned amount units and from the sale of GHG emission allowances for aviation activities, as well as proceeds from other types of agreements with international, foreign or Bulgarian sources for financing environmental-protection activities in the country. The Fund contributes to the implementation of the Bulgarian government's policy and the country's international commitments in the area of environmental protection. To date, the Fund has financed 100 projects with a total amount of around BGN 24 million. The National Trust EcoFund is an independent institution that has the support of the Bulgarian government.

4.2 KOZLODUY INTERNATIONAL DECOMMISSIONING SUPPORT FUND

The Kozloduy International Decommissioning Support Fund (KIDSF) was established in 2001 to manage the grants provided by the EU to mitigate the consequences from the early decommissioning of NPP Kozloduy Units 1–4. The KIDSF finances and co-finances projects in the following 2 areas:

- Activities related to the decommissioning of Units 1–4 (activities in the 'nuclear' sector);
- Measures that mitigate the adverse consequences in the energy sector arising from the decision to close and decommission Units 1–4 and support the required restructuring, rehabilitation and modernisation of the energy production, transmission and distribution sectors, and the improvement of energy efficiency (projects in the 'non-nuclear' sector).

In the period 2001–2009, EUR 550 million in grants were disbursed, about 47 % of which were for projects in the 'non-nuclear' sector.

In the period 2010–2013, EUR 300 million were agreed in additional grants, about 40 % of which are earmarked for projects in the 'non-nuclear' sector. These projects are in the area of energy efficiency in municipal buildings, reconstruction of public street lighting and district heating services. Grants for the 'non-nuclear' sector will not be available after that period.

4.3 ENERGY EFFICIENCY AND RENEWABLE SOURCES FUND

Bulgaria has had an Energy Efficiency and Renewable Sources Fund (FEEVI) since 2004, when it was established pursuant to the provisions of the Energy Efficiency Act. The Fund is a legal entity and operates primarily on the basis of public-private partnerships. The FEEVI is independent from State institutions and is not part of the consolidated national budget. The main donors are the UN Global Environment Fund through the International Bank for Reconstruction and Development with a contribution of USD 10 million, the Government of Austria with EUR 1.5 million, the Government of Bulgaria with BGN 3 million, and private Bulgarian sponsors.

Up to 30 June 2013 the FEEVI had signed 153 loan agreements for financing investment projects with a total amount of BGN 63 928 876. The total amount of the loans is BGN 42 866 385.

4.4 ENERGY AND ENERGY SAVINGS FUND

The Energy and Energy Savings Fund (FEEI) is a special-purpose joint-stock company. The FEEI is the first Bulgarian fund to invest in the securitisation of amounts receivable under energy-efficiency contracts, i.e. the Fund issues securities and invests the proceeds in receivables mainly in the form of projects implemented in the area of energy and efficiency.

The FEEI finances the following activities/measures: public-private partnerships in three main energy efficiency areas: buildings planned and built before 1998, industrial enterprises and infrastructure projects; EE projects in municipal and government buildings, EE measures in the industrial sector, engineering services for the reduction of energy consumption in enterprises, energy-efficiency of public street lighting; and integrated services such as energy audits, analysis and modelling, selection of measures, design, financing, implementation and monitoring.

Beneficiaries: municipalities, corporate clients, private individuals.

Type of support: lease or ESCO contracts where the investment is repaid from the guaranteed savings.

4.5 RESIDENTIAL ENERGY EFFICIENCY CREDIT LINE

The Residential Energy Efficiency Credit Line (REECL) was established in order to support private energy-efficiency projects in the industrial sector and small-scale projects in the area of renewable energy sources. Since its launch, this EUR 155 million facility has supported 230 sustainable energy projects by disbursing EUR 135.7 million in loans and EUR 21.5 million in grants (subsidies). These projects have reduced Bulgarian carbon dioxide emissions by more than 682 000 tonnes CO_2 per year and have replaced 1 047 000 MWh of electrical capacity at NPP Kozloduy with green energy resources that are sufficient to cover the electricity demand of approximately 310 000 households.

4.6 ENERGY EFFICIENCY CREDIT LINE FOR PRIVATE INDUSTRIAL ENTERPRISES IN BULGARIA

The Energy Efficiency Credit Line of the European Bank for Reconstruction and Development (EUEEFF), which was successfully completed in September 2012, offered loans to beneficiaries for energy-efficient investments. As part of its services, the Credit Line provided free technical assistance from consultancy companies and even pro bono energy audits for larger projects that had demonstrated compliance with the requirements for approval under the Line.

4.7 ENERGY EFFICIENCY CREDIT LINE FOR HOUSEHOLDS

This facility was created in 2005 as a joint initiative of the Bulgarian Government, the EBRD and the KIDSF. It consists of an EBRD loan for EUR 90 million and a KIDSF grant of EUR 24.6 million.

The EBRD provides households and associations of owners with loans for energy efficiency and RES projects through four local banks: Raiffeisenbank, ProCredit Bank, DSK Bank and SIBANK. In addition to the loan, the facility provides pro bono technical assistance and grant funding of up to 35 % of the loan.

The credit line has been extended both in time, until 31 July 2014, and in the scope of the funded activities, which now include advanced technologies such as photovoltaic systems, recuperative ventilation systems, heating substations and various installations in buildings. The available financial resources are EUR 40 million in loans and EUR 14 million in grants. The credit line is expected to improve the energy efficiency of more than 20 000 households. Since its launch, the credit line has supported 40 444 projects by disbursing EUR 62 million in loans and EUR 11.3 million in grants (subsidies). These projects have reduced Bulgarian carbon dioxide emissions by more than 206 826 tonnes CO_2 per year and have resulted in energy savings of 177 390 MWh/y.

4.8 PROGRAMME BG04 'ENERGY EFFICIENCY AND RENEWABLE ENERGY'

Programme BG04 'Energy efficiency and renewable energy' is funded by the Financial Mechanism of the European Economic Area 2009-2014 on the basis of a Memorandum of Understanding between the Republic of Bulgaria and Iceland, the Principality of Lichtenstein and the Kingdom of Norway.

Programme BG04 includes two programme areas: 'Energy efficiency' (Programme area 5) and 'Renewable energy' (Programme area 6). It includes a predefined project: 'Implementation of the European Electricity Market in Bulgaria – phase II'.

The Programme has a budget of EUR 7 647 058, which may be spent on energy efficiency improvements and the use of renewable energy for heating in municipal and state buildings and local heating systems.

4.9 OPERATIONAL PROGRAMME 'DEVELOPMENT OF THE COMPETITIVENESS OF THE BULGARIAN ECONOMY 2007–2013'

The Operational Programme 'Development of the competitiveness of the Bulgarian economy 2007–2013' is one of 7 Operational Programmes financed by the Structural Funds of the European Union after Bulgarian's accession to the EU. The Programme is financed by the European Regional Development Fund and by the national budget. The total amount of public financing available to the Programme is around EUR 1.6 billion.

The overall objective of OP 'Competitiveness' is the development of a dynamic economy, which is competitive in the European and global markets. This is to be achieved by encouraging the development of innovation and advanced technologies, enhancing productivity in enterprises, promoting investments and exports and creating a favourable business environment.

By its Decision No 107 of 24 February 2011, the Council of Ministers approved a Draft Memorandum of Understanding between the Ministry of Economy, Energy and Tourism of Bulgaria and the European Bank for Reconstruction and Development. The MoU was signed on 2 March 2011, entering into force immediately.

This enables the implementation of Indicative operation 2.3 'Implementation of energy-saving technologies and use of renewable energy sources' of Priority axis 2 'Increasing enterprise effectiveness and development of a business-friendly environment' of the Operational Programme 'Development of the competitiveness of the Bulgarian economy 2007–2013'.

4.10 OPERATIONAL PROGRAMME 'REGIONAL DEVELOPMENT 2007–2013'

The OPRD funds energy-efficiency measures in municipal and state buildings. The overall objective of the financial support for buildings is to provide educational, social and health infrastructure that is highly energy efficient and enable the use of RES in municipal buildings, thus contributing to sustainable development. OPRD beneficiaries are all municipalities in Bulgaria, meeting the conditions for each group thereof as per each specifically opened application scheme.

As concerns state-owned buildings, the OPRD offers quite limited possibilities (in terms of financial resources and the buildings selection procedure) compared to municipalities, since state-owned buildings may only be rehabilitated by OPRD grants provided to the principal of the building as an individual beneficiary.

4.11 RURAL DEVELOPMENT PROGRAMME 2007–2013

One of the financing measures of the RDP, namely 321 'Basic services for the economy and rural population', enables municipalities to implement energy-efficient projects. One of the main objectives of the programme is the improvement of living conditions in rural areas by facilitating access to quality infrastructure.

The activities eligible under the measure include:

1. Construction or rehabilitation of plants and equipment/capacities for the production of renewable heat and/or electricity in municipal buildings and/or buildings that provide various public services, deployment of networks for the distribution of biofuels or heat/electricity produced from biomass or other RES;
2. Investments for the improvement of energy efficiency in municipal buildings or other buildings used for the provision of public services.

4.12 PROGRAMMING PERIOD 2014–2020

It is envisaged that in the next programming period, 2014–2020, the measures for the improvement of energy efficiency in various industries and in buildings will continue to be a priority.

OPERATIONAL PROGRAMME 'INNOVATION AND COMPETITIVENESS 2014–2020'

In its Priority axis 3 'Energy and resource efficiency', Investment priority 3.1., the OPIC will provide targeted support for the improvement of energy efficiency within enterprises through investment in low-carbon technologies, the introduction of systems for the production of energy from renewable sources, the introduction of energy management systems, etc. The budget allocated for the implementation of these activities is nearly EUR 270 million.

ANNEX 3: ANNUAL REPORT AS PER EED

No	Key energy consumption indicator (2012)	Value	Unit	Source
1	PEC	17 839	ktoe	NSI
2	FEC(1)	9 044	ktoe	NSI
3	FEC Industry	2 577	ktoe	NSI
4	FEC Transport	2 871	ktoe	NSI
5	FEC Households	2 397	ktoe	NSI
6	FEC Services	1 000	ktoe	NSI
7	Gross value added Industry(2)	13.740(*)	BGN billion	NSI
8	Gross value added Services(2)	29.265(*)	BGN billion	NSI
9	Average disposable income of households	9 184	BGN	NIS
10	Average number of households (2011)	3 005.6	Thousand	NSI
11	GDP(2)	53.333(*)	BGN billion	NSI
12	Gross electricity generation from thermal power generation (TPPs)	2 195	ktoe	NSI
13	Gross electricity generation from combined heat and power	4 984	GWh	NSI
14	Heat generation from thermal power generation(4)	1 357	ktoe	NSI
15	Heat generation from combined heat and power(5)	46 522	TJ	NSI
16	Fuel input for thermal power generation	7 554	ktoe	NSI
17	Fuel input for combined heat and power(6)	66 419	TJ	NSI
18	Energy loss in transmission and distribution (all fuels)(7)	520	ktoe	NSI
19	Passenger kilometres (excluding personal vehicles)	17 319	mpkm	NSI
20	Tonne kilometres	36 029	mtkm	NSI
21	Combined transport kilometres	-	km	-
22	Population (1 February 2011)	7 364.57	thousand	NSI
23	Heat generation from regional heat plants(3)	188.2(**)	ktoe	AUER estimate
24	Fuel input for regional heat plants(3)	205	ktoe	NSI

Notes: (*) NSI estimates, http://www.nsi.bg.
(**) Estimated on the basis of fuel input.
(1) Without climate adjustment.
(2) Based on prices from 2005.
(3) Data required for ensuring transparent assessment of the progress made by EU countries as per the Energy Statistics Regulation (Regulation (EC) No 1099/2008).
(4) Including waste heat from industrial plants.
(5) Including use of waste heat from industrial plants.
(6) Data required for monitoring the increase in the efficiency of combined heat and power generation.
(7) Basic data required specifically for the implementation measures as per Article 15 of the EED.

ANNEX 4: MEASURES FOR THE IMPROVEMENT OF ENERGY EFFICIENCY

	Measure	Time-limit or time-span	Performance criterion/expected effect	Sector	Investments
I	**New measures**				
1	**Energy efficiency obligation schemes**	2014–2020	486 ktoe	Horizontal measure	**BGN 3 450 million (estimate)**
1.1	*Publish and promote among the clients of energy traders a list of energy-saving measures supported by them*	2020	Supports the implementation of measure I.1	Horizontal measure	-
1.2	*Apply ESCO and other types of energy-selling contracts which includes the sale, installation and maintenance of highly-efficient technology in order to optimise the process of involvement/collaboration with various social groups of final customers*	2020	Supports the implementation of measure I.1	Horizontal measure	-
1.3	*Increase traders' capacity for the provision of energy services*	2020	Supports the implementation of measure I.1	Horizontal measure	-
1.4	*Assess the options for the introduction of an energy-savings trading mechanism*	2015	Supports the implementation of measure I.1; Achievement of the indicators for an AEUR project funded by OP 'Competitiveness'	Horizontal measure	-

	Measure	Time-limit or time-span	Performance criterion/expected effect	Sector	Investments
2	Annual mandatory renovation of 3 % of the TFA of central administration buildings	2014–2020	226 000 m^2/y	Services	BGN 13.54 million/y
3	Develop a national plan to increase the number of nearly zero-energy buildings	2020	5 ktoe	Services	BGN 45 million
4	Development of rail infrastructure, improvement of inland waterways navigation and extension of metro transport	2020	-	Transport	-
5	Requirements for the purchasing of EE vehicles for the public sector and for the public transport sector	2014–2020	28 ktoe/y	Transport	BGN 56 million
6	Support the transition to a low-carbon economy by implementing EE projects in municipal buildings under Operational Programme 'Regions in Growth 2014-2020' (OPRG)	2014–2020	31.8 ktoe/y	Services	BGN 218 million
7	EE and RES utilisation in the agricultural sector within the framework of the Rural Development Programme	2014–2020	22.2 ktoe/y	Agriculture	BGN 126.7 million

	Measure	Time-limit or time-span	Performance criterion/expected effect	Sector	Investments
II	**Existing measures carried forward**				
1	Achievement by building and IS owners of their individual energy-saving targets	2008–2016	117 ktoe/y	Services/Industry	BGN 830 million
2	Energy audits of industrial systems consuming more than 3 000 MWh energy per annum	2020	151 ktoe/y	Industry	BGN 864 million
3	Audit, certification and passportisation of buildings	2008–2020	214 ktoe/y	Services	BGN 1 746 million
4	Energy-efficiency inspections of water boilers and air-conditioning systems	2008–2020	10 ktoe/y	Services	BGN 30 million
5	Mandatory formulation of energy-efficiency improvement plans for central and local government bodies	2008–2020	Supports the implementation of measure 3	Services	-
6	Introduce higher energy-efficiency requirements for public contracts for the supply of office equipment, electrical appliances, lighting, heating appliances and vehicles	2008–2020	36 ktoe/y	Services	BGN 205 million
7	Energy consumption management by owners of public buildings and industrial systems	2008–2010	Supports the implementation of sectoral measures	Services/Industry	-

	Measure	Time-limit or time-span	Performance criterion/expected effect	Sector	Investments
8	Finance the implementation of projects under the FEEVI	2020	Supports the implementation of measure 1	Horizontal measure	BGN 56 million
9	KIDSF funding for EE projects in municipal and public buildings within the 'non-nuclear' sector	2020	65 ktoe/y	Services	BGN 108 million
10	Funding of EE projects in municipal buildings (grant schemes under Operational Programme 'Regional Development' (OPRD))	2016	53 ktoe/y	Services	BGN 71 million
11	Support for energy efficiency in multi-family residential buildings (grant schemes under Operational Programme 'Regional Development' (OPRD))	2016	16.9 ktoe/y	Households	BGN 33 million