



PRO-ENERGY

“Promoting Energy Efficiency in Public Buildings of the Balkan-Mediterranean Territory”

WP3: Joint Regional Analysis, Strategy and Framework”

DELIVERABLE NUMBER: 3.3.1

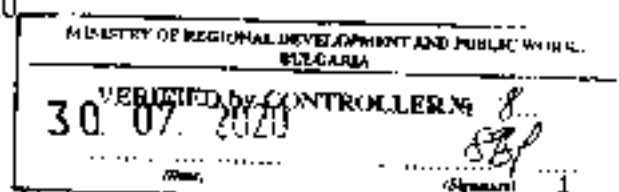
TITLE OF DELIVERABLE: Existing situation analysis-energy efficiency

PARTNER IN CHARGE: Cyprus Energy Agency – CEA

BULGARIA

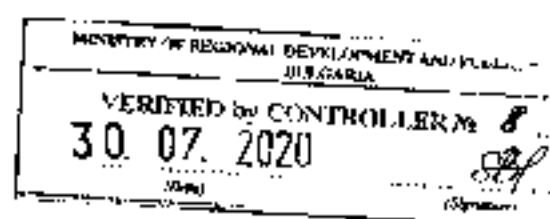
Regional Development Agency with Business Support Centre for Small and Medium-sized Enterprises

June 2020



Contents

1. Plovdiv Region: General Information	5
1.3 Statistical Data about Energy Efficiency in Public Buildings	6
1.3.1 Constructive building Characteristics	6
1.3.2 Electricity consumption	7
1.3.3 Renewable Energy Sources	8
1.3.4 Energy Performance Certificate	15
2. Stakeholders in Plovdiv Region Relevant to Energy Efficiency of Public Buildings ..	20
3. Analysis of Energy Efficiency Investments in the area, mapping of policies, interventions and initiatives	23
3.1 Investments of Energy Efficiency	23
3.2 Mapping of policies	53
3.2.1 Relevant EU Directives	53
3.2.2 National Implementation of EEU Directives and other relevant National Regulation	57
3.3 Interventions and Initiatives	59
4. Policy – makers and Public Authorities Planning, Promoting and Implementing Initiatives of Improving Energy Efficiency in [Name of Region]	61
5. Analysis of the Regional and National Legal and Regulatory Framework in [Name of Region] and Relevant Policy- Making Trends	69
5.1 Regulations at Regional and Local Level	69
5.2 Relevant Policy – Making Trends	69
6. Analysis of Relevant Strategies and their Objectives	71
7. References	77
8. Annex	78



LIST OF ACRONYMS AND ABBREVIATIONS

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
NFK	Natsionalna Elektricheska Kompania
NPDFVI	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
REEVI	Energy Efficiency and Renewable Sources Fund
EEF	Energy and Energy Savings Fund
CHPP	Combined heat and power plant
NPSB/NPE	National plan for nearly zero-energy buildings
NPDEE	National energy efficiency act on plan 2014–2020
ME	Ministry of Energy
MPPUERSBF	Municipal Program for Promotion of the Use of Energy from Renewable Sources and Biofuels
ZEE	Energy Efficiency Act
ZEV	Energy from Renewable Sources Act
EEVI	Energy Efficiency and Renewable Energy Fund
NZEB	Nearly zero-energy buildings
ESM	Energy Saving Measures
SCR	South Central Region
SL	Street lighting



OPRG	Operational Programme "Regions in growth"
DHWS	Domestic hot water supply
IHI	Internal heating installation
RES	Renewable Energy Sources
SEDA	Sustainable Energy Development Agency (SEDA)

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 ² K	watts per square meter required to achieve a temperature difference of 1 Kelvin
Ttoe	thousands of tons of oil equivalent



1. Plovdiv Region: General Information

Plovdiv Region/District is located in the central part of Southern Bulgaria on an area of 5972.9 km² and has a population of 675,586 people (according to NSI data for 2014).

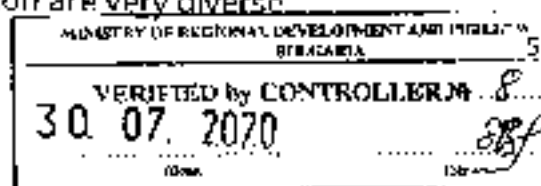
There are 18 municipalities on the territory of Plovdiv district - Asenovgrad municipality, Brezovo municipality, Kaloyanovo municipality, Karlovo municipality, Krichim municipality, Kuklen municipality, Lucky municipality, Perushtitsa municipality, Parvomay municipality, Rakovski municipality, Sadovo municipality, Sopot municipality, Stamboliyski municipality, Saedinenie, Hissarya municipality, Maritsa municipality, Rodopi municipality and Plovdiv municipality.

Priority industries in Plovdiv district are agriculture, food industry, tourism, clothing and textile industry, wood processing and furniture industry. The growth of the IT sector, outsourcing, the processing industry, business services and communication services is also great. These are the sectors with the most significant contribution to the employment of graduates and qualified staff.

Plovdiv and the region are among the most important tourist destinations that glorify Bulgaria in the world with its huge cultural and historical heritage and rich archeology. Plovdiv is the oldest living city in Europe and the sixth oldest city in the world. Plovdiv has been chosen to be the European Capital of Culture in 2019. Plovdiv is a geographical and logistical center of the Thracian tourist region, which is endowed with abundant nature with resources - mountains, valleys, valleys, rock formations, caves, lakes, dams, rivers, mineral and karst waters, diverse flora and fauna, and with a unique anthropogenic resource - Thracian and medieval fortresses, Revival settlements, religious temples, fairs, architectural and ethnographic and folklore reserves. The possibilities for combining cultural with health, rural, spa and sports tourism in the region are very diverse.



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1.1. Climate and Temperature Area

The climate in Plovdiv is transitional-continental, typical for quite central southern parts of Europe. The average annual temperature is 12.3 ° C. The average maximum temperature in July was 30.3 ° C, and the absolute maximum was measured on July 5, 2000: 45 ° C. The average annual minimum temperature is 6.5 ° C, and the absolute minimum is minus 31.5 ° C, measured in the morning of January 24, 1942 in a state of temperature inversion.

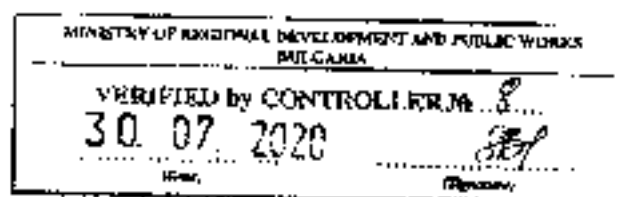
The average annual relative humidity is 73%, with the highest in December (86%) and the lowest in August (62%).

1.3. Statistical Data about Energy Efficiency in Public Buildings

1.3.1. Constructive building characteristic

1,068,309.6	925	1,154
-	99	-
-	40	-
-	13	-

Table 1.3.1.1. Total area and number of public buildings



Brick	No	$U < 0,50$	$U < 0,15$
Concrete	No	$U < 0,50$	$U < 0,15$
Wooden	No	$U < 0,30$	$U < 0,15$
Wooden	No	$U < 2,60$	$U < 0,70$

Table 1.3.i.2. Overall structural data of a typical public building

1.3.2. Electricity consumption

Before insulation regulations	155 MWh/y
After insulation regulations	120 MWh/y
Before insulation regulations	349 MWh/y
After insulation regulations	175 MWh/y

Table 1.3.2.1. Energy demand of public buildings and schools



Central heating	Individual Air Conditioner	Central heating	Fluorence
Central heating or local heating diesel or pellets boiler			Fluorence

Table 1.3.2.2. Overall system data of a typical public building and school

1.3.3. Renewable Energy Sources

SOUTH CENTRAL REGION

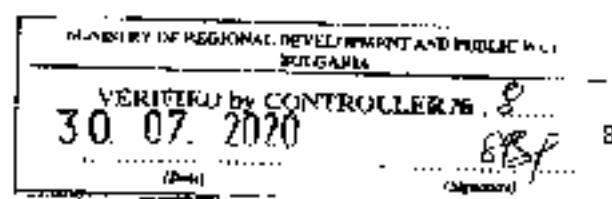
Municipal programs and submitted reports on their implementation in ASED

South Central Planning Region 5 districts - Plovdiv, Pazardzhik, Haskovo, Kardzhali and Smolyan with a total of 58 municipalities.

Reports on the implementation of MPPUERSBF for 2018 were submitted by 55 municipalities and 5 district administrations. No reports were submitted by 3 municipalities - Parvomay, Haskovo and Strelcha.

Region	Number of municipalities	Municipalities with operating MPPUERSBF until 2018.	Municipalities with operating MPPUERSBF after 2018.	Number of municipalities without MPPUERSBF 2018.	Number of municipalities without annual report for 2018
Plovdiv	18	1	8	8	1
Pazardzhik	12	1	8	2	1
Haskovo	11	2	7	1	1
Kardzhali	7	-	5	2	-
Smolyan	10	0	8	2	-
Total	58	4	36	15	3

MPPUERSBF – Municipal Programme for Promotion of the Use of Energy from Renewable Sources and Biofuels



The municipalities with operating MPPUERSBF for 2018 are 40:

- **Plovdiv Region/District - Kalayanovo, Karlovo, Rhodopes, Krichim, Lucky, Perushtitsa, Maritsa, Saedinenie, Hissarya;**
- *Pazardzhik District - Batak, Belovo, Bratsigova, Velingrad, Lesichovo, Panagyurishte, Pazardzhik, Rakitovo, Septemvri;*
- *Haskovo District - Dimitrovgrad, Ivaynovgrad, Lyubimets, Madzharovo, Min. Bani, Svilengrad, Simeonovgrad, Stambolovo, Topolovgrad;*
- *Kardzhali District - Ardino, Chernoochene, Momchilgrad; Jebel, Krumovgrad;*
- *Smolyan District - Banite, Dospat. Smolyan, Madan, Zlatograd, Nedelino, Rudozem, Chepelare.*

There are a total of 15 municipalities without operating MPPUERSBF

- **Plovdiv Region - Plovdiv, Asenovgrad, Brezovo, Rakovski, Sopot, Sadovo, Stamboliyski, Kuklen;**
- *Pazardzhik District - Satnitsa, Peshtera;*
- *Haskovo District - Harmanli;*
- *Kardzhali District - Kirkovo, Kardzhali;*
- *District Smolyan - Borina, Devin.*

Implemented measures for RES in 2018 in the South Central Region Implemented technical measures for production of RES

In 2018, the municipalities from the South Central Region of Bulgaria have implemented 9 technical measures in 4 districts, using 2 types of renewable energy sources - biomass and solar energy.

➤ **Plovdiv Region**

For the utilization of solar energy and its conversion into heat energy, 4 units have been built. installations with a total installed capacity of 27.9 kW at a value of BGN 67,92 thousand:

- Construction of a solar installation for DHWS (domestic hot water supply) at Plovdiv Language High School - dormitory boys;
- Construction of a solar installation for DHWS (domestic hot water supply) at Plovdiv Language High School - dormitory girls;



- Solar installation for DHWS of Plovdiv Language High School - educational building - Plovdiv;
- Solar installation for DHWS of kindergarten "Zvezdichka", village of Stambolovo.

➤ **Pazardzhik Region**

		<i>kW</i>	<i>MWh/year</i>	<i>Thousands</i>	
Biomass	Thermal	407	13	35	1
Solar	Thermal	-	3	70,58	2
Total		407	17	105,78	3

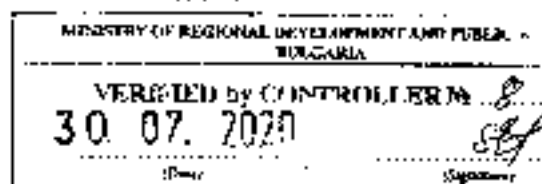
For the utilization of biomass and its conversion into thermal energy, an installation has been installed, burning pellets in the primary school "Konstantin Velichkov" in the village of Patalenitsa, Pazardzhik.

For the utilization of solar energy and its conversion into thermal energy, 2 installations have been built - DHWS in kindergarten "First of June" and kindergarten "Raina Knyaginya" - Branch building - Panagyurishte; DHWS in kindergarten "Spring" - Panagyurishte.

➤ **Smolyan Region**

For the utilization of biomass and its conversion into heat energy, an installation was built in the building of the Border Police Department in the town of Zlatograd. The total installed capacity is 30 kW, and the investment amounts to BGN 8,000 with an expected annual production of 30 MWh.

➤ **Kardzhali Region**



For the utilization of solar energy and its conversion into electricity, 1 installation



was built in municipality Kirkovo. The installed capacity is 4.6 kW and the investment amounts to BGN 42.6 thousand with an expected annual production of 40 MWh.

➤ **Haskovo Region**

In 2018, no technical measures have been implemented in the district.

➤ **Total for SCR**

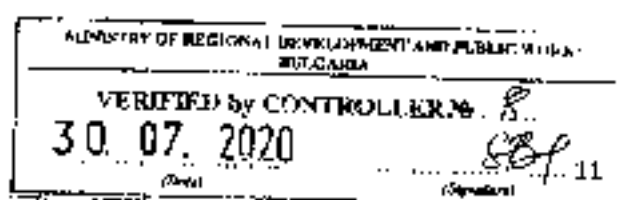
		<i>kW</i>	<i>MWh/year</i>	<i>Thous BG</i>	
Biomass	Thermal	437	165	43	2
Solar	Thermal	27,88	35	138,5	6
Solar	Electric	4,6	40	42,	1
Total		469,48	24	224,1	9

In 2018, the municipalities of the South Central Region of Bulgaria have implemented 9 technical measures for production of RES with a total installed capacity of 469.48 MW.

From the applied measures for utilization of biomass and solar energy, in 2018 the production of a total of 240 MWh / year has started. Thermal energy is 200 MWh / year and electricity 40 MWh / year, annual production.

In 2018, investments are focused on the production of heat and electricity from the sun - BGN 181.1 thousand (81%). BGN 43 thousand (19%) have been invested in the utilization of energy from biomass. The measures are funded by:

- The National Trust EcoFund (NIEF) – BGN 68 thousand;
- Programme BG04 – BGN 8 thousand;
- Other – BGN 148 thousand.



Evaluation of the effect of the implemented technical measures for production of RES in 2018.

The following tables show the assessment of the effect of the implemented technical measures for production of RES in 2018 in each area of the South Central Region of Bulgaria by type of renewable energy and produced energy, saved fuels and saved funds:

➤ **Haskovo Region**

In 2018, no technical measures have been implemented in the region.

➤ **Pazardzhik Region**

		MWh/year	thous t/year	t/year	
Biomass	Thermal	No data	12	No data	1
Solar	Thermal	20,16	7,66	16,51	2
Total		20,16	19,66	16,51	3

➤ **Plovdiv Region**

		MWh/year	Thous t/year	t/year	
Solar	Thermal	112,23	12,32	91,9	4

➤ **Smolyan Region**

		MWh/year	Thous t/year	t/ye	
Biomass	Thermal	27,5	1,46	1,42	1

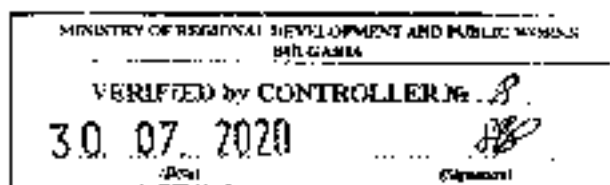
➤ **Kardzhali Region**

		<i>MWh/year</i>	<i>Thous /year</i>	<i>t/y</i>	
Biomass	Thermal	40,3	No data	33,01	1

➤ **Total SCR of Bulgaria**

		<i>MWh/year</i>	<i>Thous /year</i>	<i>t/y</i>	
Biomass	Thermal	27,49	1,46	13,62	2
Solar	Thermal	132,39	31,98	96,42	6
Solar	Electric	40,3	-	33,01	1
Total		200,2	33,44	143,05	9

With the applied in 2018 technical measures for utilization of renewable energy, the municipalities of the South-Western Republic of Bulgaria have achieved a total of 200.2 MWh of annual energy savings, which is equal to BGN 33 thousand / year savings and 143 tons / year saved CO2 emissions.



Comparison of the implementation of MPPUERSBF - Municipal Programme for Promotion of the Use of Energy from Renewable Sources and Biofuels in the South Central Region of Bulgaria in 2016, 2017 and 2018.

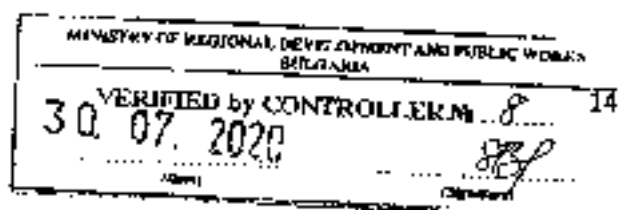
2016	58	4	23	20	7
2017	58	1	34	19	4
2018	58	4	36	15	3

Implemented technical measures for production of RES

	<i>kW</i>	<i>MWh/per year</i>	<i>BGN Thousands</i>	<i>Number</i>
2016	4 358,50	1 646,37	2 451,32	22
2017	1 985	1 074	2 024	48
2018	469,48	240	224,10	9

Assessment of the effect of the implemented technical measures for production of RES

	<i>MWh/per year</i>	<i>Thousand BGN.</i>	<i>Ton/per year</i>	<i>Number</i>
2016	1 068,73	274,87	638,997	22
2017	1 697	187	983	48
2018	200	33,44	143,05	9



1.3.4 Energy Performance Certificate

Energy performance certificates for buildings

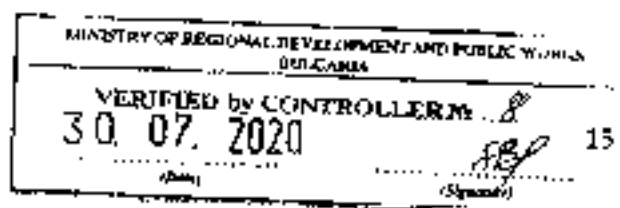
The amendments to the Energy Efficiency Act explicitly set the requirement for energy efficiency certification of all buildings over 1000 m², regardless of the type of their ownership. The purpose of energy efficiency certification of buildings is to verify the current state of energy consumption in buildings, energy performance and their compliance with energy consumption classes.

The issuance of a certificate is carried out on the basis of the results obtained from an inspection for energy efficiency, which must be performed by a licensed company under Art. 16 of the Act and must cover the entire building, not just individual parts of it. The energy performance certificate contains information on the specific energy consumption of the building, its "energy class", as well as a feasibility study of appropriate energy saving measures, including estimated return on investment.

Depending on the results of the examination, the certificates are issued with category "A", "B" or without category. The category is determined by comparing the energy performance of the building with the current energy efficiency standards and the standards in force during the year of commissioning of the building. Buildings put into operation after 2005 cannot receive an "A" or "B" certificate, because during construction they must meet the current standards.

If the issued certificate is of category "A" or "B", the owners will be exempt from building tax for 7 or 3 years, respectively. If the building has implemented measures for the introduction of renewable energy sources, these terms are extended to 10 and 5 years, respectively.

When selling a building or parts of a building, the seller provides the buyer with the original of the energy performance certificate of the building, and when renting a copy of the certificate.



The current regulatory framework in the field (Ordinance No 16-1594 of 13.11.2013 on energy efficiency inspection, certification and assessment of energy savings of buildings) defines two types of certificates - a certificate of design energy performance of the building before it is introduced in operation and certificates for energy performance of buildings in operation.

The certificate for design energy characteristics is issued after the completion of the construction of a new building before its commissioning or after the elaboration of the investment project before the issuance of a construction permit for the building (by order of the assignor / owner).

The second certificate is issued after an inspection, which takes into account how much energy the building consumes, what are the opportunities to reduce energy costs and what are the recommended measures to optimize energy efficiency. The procedure ends with an assessment of energy savings - the result of the implementation of one or a group of measures aimed at increasing energy efficiency. Inspection and certification of buildings can be performed only by experts - consultants on energy efficiency. They must meet certain requirements and be registered.

The energy efficiency inspection procedure is mandatory for public buildings that meet three conditions - to be state or municipal property, to be in operation and with a total built-up area of over 500 square meters. From July 9, 2015 the last requirement changes - the building must have a total built up area of over 250 square meters.

The issuance of documents requires the contracting authority to provide the consultant in advance with an investment (executive) project; construction documents; the results of already performed tests of the enclosing structures, systems and elements in the building, as well as of the technical installations.

Energy efficiency audit

The energy performance audit of buildings includes the identification of building enclosures and elements and systems to ensure the microclimate, measurement and



calculation of energy performance, as well as analysis and determination of the potential for reducing energy consumption.

The next stage is the development of measures to increase energy efficiency, their feasibility study and assessment of saved carbon dioxide (CO₂) emissions as a result of the implementation of the recommended measures.

The subject of the survey audit is also the analysis of the possibilities for the use of energy from renewable energy sources - part of the assessment of the annual energy consumption in the cooperative.

Certificate for design energy characteristics

The certificate for design energy characteristics contains data on the functional purpose of the building, location, photo of the building / computer graphics; the general geometrical characteristics, incl. the total built-up area, the heated area, the area of the cooled volume; class of energy consumption.

It also indicates the value of the integrated energy performance of the building and its reference value, expressed as a specific annual consumption of energy required in kWh / m², and primary energy - in cases where it is calculated in the project of the building in kWh / m²; the net energy required in the absence of internal loads, as well as the gross energy required taking into account the internal loads in kWh / m²; the total annual consumption of required energy in MWh, the total annual consumption of primary energy in MWh - in the cases when it is calculated in the project of the building; the design value of carbon dioxide (CO₂) emissions equivalent to the total annual energy consumption.

In the presence of such, the certificate also presents the energy from renewable sources in absolute value and as a relative share of the gross energy required for the building; the specific geometrical characteristics of the enclosing structures, their design energy characteristics, incl. their reference values.

Sources of energy in the building are described, including renewable, the energy performance values of the microclimate systems, expressed as a specific annual energy consumption for heating, ventilation and cooling in kWh / m².



The issued certificate also provides information on the value of the specific annual energy consumption of the domestic hot water system, in kWh / m², and the energy sources used, incl. renewable.

Inspection /Audit of buildings in operation

The inspection of buildings in operation covers the following technical means and systems: the means for measuring and controlling the energy flows in the building; fuel combustion systems and conversion of energy flows entering the building, incl. from renewable sources; heat transfer systems - water, steam condensate, air; power supply systems; lighting systems; microclimate systems; domestic hot water systems and building enclosing structures and elements.

Stages of audit

In the first, the so-called preparatory stage of the survey, the building is inspected, the primary information about its operation and energy costs for a representative previous period of time are collected and processed.

The second stage includes a more detailed analysis of the existing condition and energy consumption of the building, preparation of energy balances and determination of the baseline of energy consumption. As a result, the energy performance of the building and the potential for their improvement are determined.

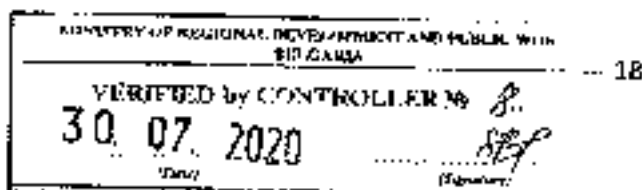
In the third stage of the audit, specific measures to increase energy efficiency are developed and the annual amount of energy savings is determined, as well as the amount of CO₂ emissions saved. The final phase of the audit envisages the preparation of a report reflecting the results of the inspection and providing it to the owner of the building.

Term of validity of the certificate

For buildings in operation, the energy performance certificate has a 10-year validity period. The next certificate must be issued within one year after the expiry of the previous one.



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The certificate is updated with the issuance of a new certificate in all cases of activities leading to the improvement of the overall energy performance of the building, such as reconstruction, major renovation, overhaul or reconstruction of the building, maintenance of building installations and other activities.

According to the ordinance, in case of changes in the conditions under which the certificate is issued, as well as in case of change of the circumstances reflected in it, the owner of the building should perform a new inspection/audit for energy efficiency and certification of the building.

The owner of the building or the assignor of the procedure is obliged not later than 30 days from the commissioning of the new building to submit to the Agency for Sustainable Energy Development a certified copy of the certificate for design energy performance.

Tax exemption

A special scale of energy consumption classes defines buildings - from the high-efficiency class A to the lowest-efficiency class G. The Law on Local Taxes and Fees provides for buildings with a certificate of energy performance category "A" or "B" to be exempt from tax for a period up to 10 years.

The preference starts from the year following the date of issue of the certificate. If the certificate is of category "A", the exemption from building tax is for a period of seven years. If measures related to the use of renewable energy sources are applied in the building, this period shall be extended to ten years.

In the case of a certificate for a building of category "B", the exemption from building tax is for a period of 3 years. In case of introduced measures for use of renewable energy sources this term becomes five years. The tax exemption for buildings (as a result of their energy efficiency certification) applies only if the properties are not used for commercial purposes.

However, the tax relief applies only to buildings put into operation before 1 January 2005. The reason is that the new construction is subject to mandatory rules and standards for energy efficiency and therefore in full compliance with legal norms.



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MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS		19
BULGARIA		
VERIFIED by CONTROLLER No 8		
30.07.2020		
(Date)		(Signature)

2. Stakeholders in Plovdiv Region Relevant to Energy Efficiency of Public Buildings

Stakeholders

At national level

- Sustainable Energy Development Agency (SEDA is a legal entity at state budget support with headquarters in Sofia and has the status of an executive agency within the Ministry of Energy)
- Association of Bulgarian Energy Agencies
- Ministry of Regional Development and Public Works

At regional level – South Central Planning Region (NUTS 2)



- Ministry of Regional Development and Public Works – General Directorate "Strategic Planning and Programmes for Regional Development Department "South Central Region"
- Council of Regional Development of South Central Region
- 5 Regional governors of Plovdiv, Pazardzhik, Smolyan, Haskovo, Kardzhali (NUTS 3)

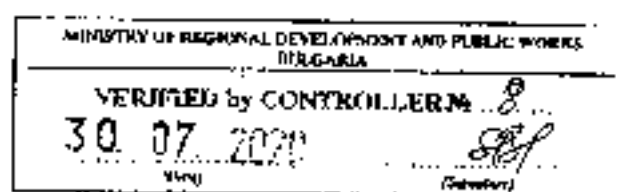
BG421 Plovdiv Region; BG422 Haskovo Region; BG423 Pazardzhik Region;

BG424 Smolyan Region; BG425 Kardzhali Region

5 Regional Administrations of Plovdiv, Pazardzhik, Smolyan, Haskovo, Kardzhali

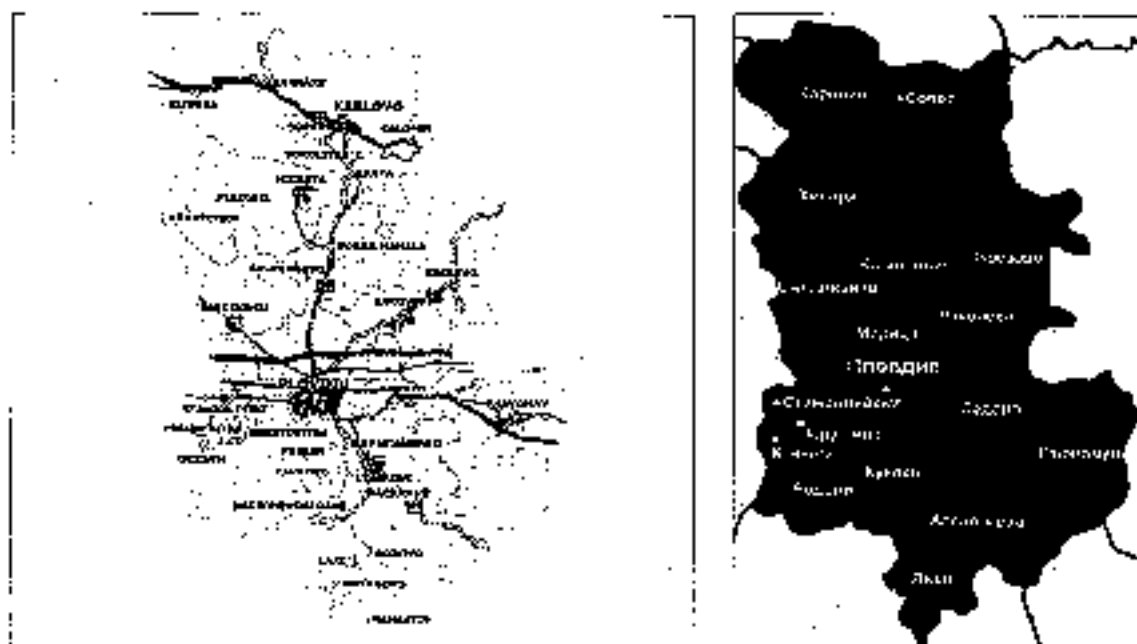


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- 5 Regional centres – municipalities of Plovdiv, Pazardzhik, Smolyan, Haskovo, Kardzhali
- Regional Council for sustainable energy development of Plovdiv region
Областен съвет за устойчиво енергийно развитие на област Пловдив
- Council of energy efficiency and RES at Regional administration – Pazardzhik

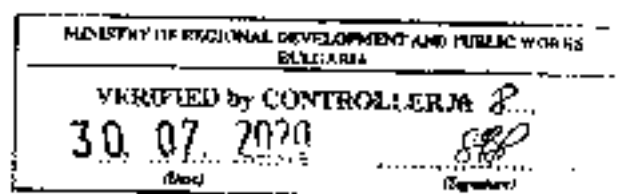
At regional level – Plovdiv Region (NUTS 3) - BG421



- All 18 municipalities: Asenovgrad, Brezovo, Kaloyanovo, Karlovo, Lucky, Martista, Plovdiv, Parvomai, Rakovski, Dedopi, Sadovo, Saedinenie, Hissar, Kritchim, Perustista, Stamboliyski, Kuklen, Sopot

- At municipal level

- Plovdiv municipality
- Mayor of Plovdiv
- Municipal Council
- Energy Agency Plovdiv <https://www.eap-save.eu/>
- Regional Energy Agency Pazardjik <http://reap-bg.eu/home.html>



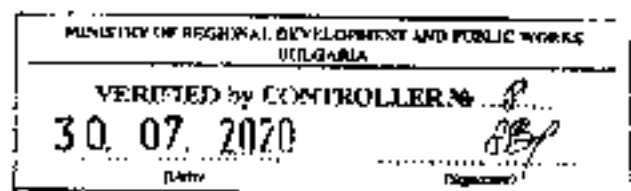
- Regional Council for sustainable energy development of Plovdiv region https://pd.government.bg/?page_id=1440
- SEDA Regional representative Plovdiv

Universities:

- University of Food Technologies Plovdiv
- Technical University Sofia – branch Plovdiv

Companies:

- EVN Trading South East Europe JSCo
EVN Bulgaria District Heating JSCo - Energy Policy and Environment Department
- CityGas Bulgaria JSCo
- EVN Trading South East Europe
- EVN Bulgaria EAD - Energy Policy and Environment Department
- Regional Construction Chamber Plovdiv



3. Analysis of Energy Efficiency Investments in the area, mapping of policies, interventions and initiatives

3.1 Investments of Energy Efficiency

SOUTH CENTRAL REGION

Energy Efficiency programmes and submitted reports on their implementation in SEDA

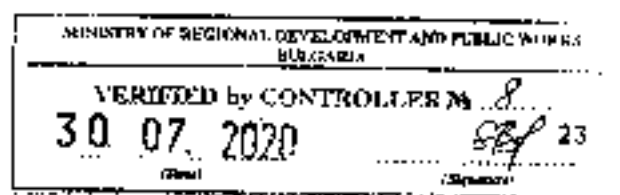
South Central Planning Region includes 5 regions - Plovdiv, Pazardzhik, Haskovo, Kardzhali and Smolyan with a total of 58 municipalities.

- ✓ Regional programmes under Energy Efficiency Act (ZEE) - 1 pc.
- ✓ Municipalities that do not have a ZEE programme - 17
- ✓ Municipal programmes under ZEE with expired term - 7 pcs.
- ✓ Municipal programs under ZEE with validity until 2019 - 2 pcs.
- ✓ Municipal programs under ZEE with a validity period after 2019 - 32 pcs.

Reports on the implementation of energy efficiency programmes for 2018 were submitted by 57 municipalities (98.3%) and 5 Regional Administrations (100%).

The trend for municipal and regional/district administrations continues implementation of ESM on building stock. Due to opportunities for financing energy efficiency projects, a significant number of projects for improving the energy efficiency of street lighting (SL), ESM measures for building stock, solar collectors for DHWS, etc. are being implemented.

The declared results from the implementation of the energy efficiency plans are based on the inspection reports, calculations according to the specialized methodologies or the own assessments of the municipal administrations. Some of the reports presented on the implementation of energy efficiency programs describe attached ESMs, but there is no assessment of their impact.



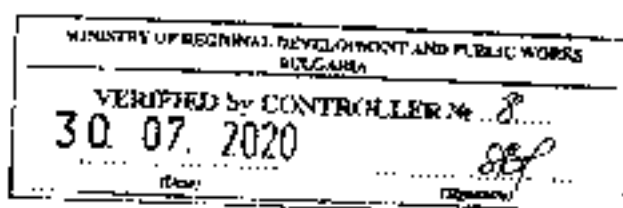
PLOVDIV REGION

There are 18 municipal administrations in Plovdiv district. In 2019, the ESM on building stock, external MA and use of RES were performed in a total of 9 municipalities.

Type	Num. ESM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emission ston/y
Implemented ESM in buildings *	113	3 477,7	1 629,19	41,65	1 116,56
SL systems with completed ESM in 2019	3	2 054	305,12	310,2	249,89
Use of RES	1	N/A	14,51	N/A	11,88
Total Plovdiv region	117	5 541,7	1 948,82	351,85	1 378,33

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

The reporting forms of the municipalities of Brezovo, Kuklen, Maritsa and Parvomay contain only the values for the investments made, which makes it impossible to account for the saved fuels and energies, as well as for the emissions and the redemption period of the measure.



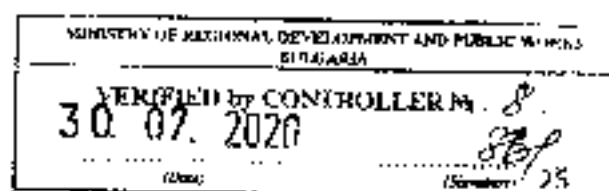
The reporting form of the municipality of Sadovo does not contain values for the investments made and savings saved, which makes it impossible to take into account the term of redemption of the measure.

The reporting forms of the municipalities of Asenovgrad and Plovdiv do not contain values for saved funds, therefore the term of redemption of the measure cannot be reported either.

In 2019, a total of 117 were performed in Plovdiv district, ESM in 34 municipal buildings with a total area of 52,870 m²:

- Thermal insulation of external walls - 24 pcs. measures in the municipalities of Asenovgrad, Karlovo, Maritsa, Plovdiv, Parvomay, Sadovo and Sopot;
- Thermal insulation of the roof - 23 pcs. measures in the municipalities of Asenovgrad, Karlovo, Maritsa, Plovdiv, Brezovo, Sadovo and Sopot;
- Thermal insulation of the floor - 8 pcs. measures in the municipalities of Asenovgrad, Karlovo, Sadovo and Sopot;
- Replacement of windows and doors - 27 pcs. measures in the municipalities of Asenovgrad, Karlovo, Brezovo, Kuklen, Maritsa, Parvomay, Plovdiv, Sadovo and Sopot;
- ESM of heating and pipe network - 20 pcs. measures in the municipalities of Asenovgrad, Kaloyanovo, Karlovo, Parvomay, Sadovo and Sopot;
- ESM under the DHW system - 1 pc. in common, Sadovo;
- ESM for lighting systems - 11 pcs. measures in the municipalities of Asenovgrad, Plovdiv and Sadovo;
- ESM by MA systems - 3 pcs. measures in the municipalities of Karlovo and Kaloyanovo.

In 2019 no inspections of buildings and systems for external SL were performed.



PAZARDZHIK REGION

There are 12 municipal administrations in Pazardzhik district. In 2019, the ESM on the building stock were performed in 3 places. municipalities - ESM on enclosing elements, heating and lighting installations.

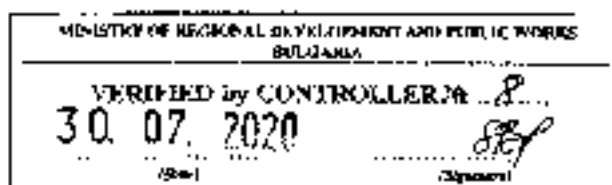
In the reporting form of the municipality of Sarnitsa, some of the ESM have only the values for the investments made, which makes it impossible to report the saved fuels and energy, as well as the emissions and the redemption period of the measure. The reporting form of the municipality of Belovo does not contain values for saved funds, which makes it impossible to account for the redemption period.

A total of 41 were made. ESM in 15 municipal buildings with a total area of 30,009 m²:

- Thermal insulation of external walls - 13 pcs. measures in the municipalities of Belovo, Pazardzhik and Sarnitsa;
- Thermal insulation of the roof - 7 pcs. measures in the municipalities of Pazardzhik and Sarnitsa;
- Replacement of windows and doors - 13 pcs. measures in the municipalities of Belovo, Pazardzhik and Sarnitsa;
- ESM of heating and pipe network - 4 pcs. measures in the municipality of Pazardzhik;
- ESM for lighting systems - 4 pcs. measures in the municipality of Sarnitsa.

The amount of investments amounts to BGN 4,441 thousand / year, as the amount of energy saved is 2,221 MWh / year, of the saved funds - BGN 167 thousand / year, and of CO₂ emissions - 508 tons / year.

In 2019 In Pazardzhik region/district no inspections of buildings and systems for external SL were performed.



KARDZHALI REGION

There are 7 municipal administrations in the region/district of Kardzhali. In 2019, the ESM on building stock and use of RES were performed in 3 municipalities.

Type	Num. ESM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emission ston/y
Implemented ESM in buildings *	58	6 830	1 234	N/A	394
Use of RES	3	N/A	13	N/A	16
Total district of Kardzhali	61	6 830	1 247		410

* ESM on enclosing elements, heating and ventilation, air conditioning, measuring systems and automation, heating and lighting installations (without gasification and use of RES)

The reporting form of the Municipality of Kardzhali contains only values for the investments made, which makes it impossible to account for the saved fuels and energy, as well as for the emissions and the redemption period of the ESM. The reporting form of the municipality of Krumovgrad does not contain values for the investments made and savings saved, therefore the term of redemption of the ESM cannot be reported.

In the region/district of Kardzhali in 2019 a total of 61 ESMs were performed in 6 cases, municipal buildings with a total area of 37,362 m²: - Thermal Insulation of external walls - 14 pcs. measures in the municipalities of Krumovgrad and Kardzhali;

- Thermal insulation of the roof - 12 pcs. measures in the municipalities of

Krumovgrad and Kardzhali;

- Thermal insulation of the floor - 5 pcs. measures in the municipality of Krumovgrad;
- Replacement of windows and doors - 10 pcs. measures in the municipalities of Krumovgrad and Kardzhali;
- ESM of heating and pipe network - 12 pcs. measures in the municipalities of Krumovgrad and Kirkovo;
- ESM under the DHW system - 3 pcs. measures in the municipality of Krumovgrad;
- ESM for lighting systems - 5 pcs. measures in the municipalities of Krumovgrad and Kardzhali.

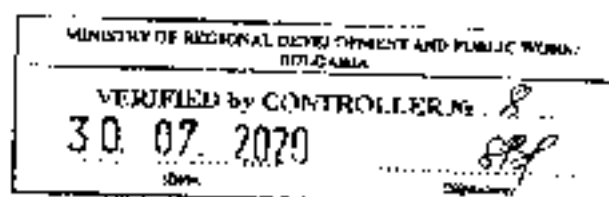
In 2019 in the region/district of Kardzhali no inspections of buildings and systems for external SL were performed.

HASKOVO REGION

There are 11 municipal administrations in Haskovo district. In 2019, ESM on building fund and use of renewable energy sources were applied in 4 municipalities.

Type	Num. ESM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emission ton/y
Implemented ESM in buildings *	17	617,2	11,6	N/A	3,61
Use of RES	1	100	N/A	N/A	N/A
Total Haskovo district	18	717,2	11,6		3,61

* ESM on enclosing elements, heating and ventilation, air conditioning, measuring systems and automation, heating and lighting installations (without gas-firing and use of RES)

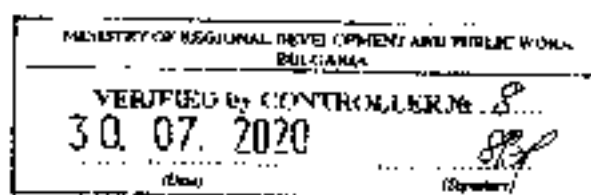


The reporting forms of the municipalities of Topolovgrad and Harmanli contain only the values for the investments made, which makes it impossible to take into account the saved fuels and energy, as well as the emissions and the redemption period of the ESM. The reporting form of Stambolovo municipality does not contain values for saved funds, which makes it impossible to account for the term of redemption of the ESM.

In Haskovo region/district, 18 ESM are applied in 5 municipal buildings with a total area of 5 882 m²:

- Thermal insulation of external walls - 4 pcs. in the municipalities of Stambolovo, Harmanli and Topolovgrad;
- Thermal insulation of the roof - 3 pcs. in the municipalities of Harmanli and Topolovgrad;
- Thermal insulation of the floor - 1 pc. in the municipality of Harmanli;
- Replacement of windows and doors - 5 pcs. measures in the municipalities of Stambolovo, Harmanli and Topolovgrad,
- ESM of heating and pipe network - 1 pc. in the municipality of Harmanli;
- ESM under the DHW system - 1 pc. in the municipality of Harmanli;
- ESM for lighting systems - 3 pcs. in the municipalities of Stambolovo and Topolovgrad.

In 2019, an inspection of 12 buildings in the municipality of Haskovo was carried out with a total area of 20,364 m². No inspections of external MA systems have been performed



SMOLYAN REGION

In Smolyan district there are 10 municipalities. In 2019, the ESM on buildings and external MA were carried out in 4 municipalities.

Type	Num. ESM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emission ton/y
Implemented ESM in buildings *	15	2 196,23	1 134,09	79,07	305,05
SL systems with completed ESM in 2019	2	90	N/A	13	N/A
Total Smolyan district	17	2 286,23	1 134,09	92,07	305,05

* ESM on enclosing elements, heating and ventilation, air conditioning, measuring systems and automation, heating and lighting installations (without gasification and use of RES)

The reporting form of the municipality of Velingrad contains only the values for the investments made, which makes it impossible to report the saved fuels and energy, as well as the emissions and the redemption period of the ESM.

A total of 17 were made in Smolyan district. ESM in 7 municipal buildings with a total area of 14,742 m²:

- Thermal insulation of external walls - 4 pcs. in the municipalities of Smolyan, Velingrad, Zlatograd and Chepelare;
- Thermal insulation of the roof - 4 pcs. in the municipalities of Smolyan Velingrad, Zlatograd and Chepelare;
- Thermal insulation of the floor - 2 pcs. measures in the municipalities of Smolyan and Velingrad;

- Replacement of windows and doors - 4 pcs. in the municipalities of Smolyan, Devin and Zlatograd;
- ESM of heating and pipe network - 1 pc. in the municipality of Chepelare;
- ESM by MA systems - 2 pcs. in the municipality of Zlatograd.

In 2019, an inspection of 6 buildings in the municipalities of Banite, Chepelare and Devin was carried out with a total area of 11.498 m². No inspections of external SL systems have been performed.

Summarized assessment of the effect of the measures implemented in 2019 to increase energy efficiency in the South Central Region

Type	Num. LSM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO ₂ emissions t/y
implemented ESM in buildings	244	19 433	6 230	288	2 327
SL systems with completed ESM in 2019	5	2 154	305	324	250
Use of RES	5	100	28	N/A	28
Total SCR	254	21 687	6 563	612	2 605

* ESM on enclosing elements, heating and ventilation, air conditioning, measuring systems and automation, heating and lighting installations (without gasification and use of RES)

Summarized assessment of the effect of the measures implemented in 2019 to increase energy efficiency in South Central Region

South Central RP covers 5 districts with a total of 58 municipalities. In 2019, the ESM on buildings and external SL were performed in 22 municipal administrations.

Type	Num. ESM	Investments (thous. lev)	Saved fuels and energies (MWh/yr)	Savings saved (thous. lev)	Saved CO ₂ emissions (ton/yr)
Implemented ESM in buildings *	244	19 433	6 230	288	2 327
SL systems with completed ESM in 2019	5	2 154	305	324	250
Use of RES	5	100	28	N/A	28
Total SCR	254	21 687	6 563	612	2 605

* ESM on enclosing elements, heating and ventilation, air conditioning, measuring systems and automation, heating and lighting installations (without gasification and use of RES)

Assessment of the effect of the measures implemented in 2019 to increase energy efficiency in the South-West Republic of Bulgaria in graphs

➤ Number of implemented measures by types

ESM for SL	5	
ESM for lighting		23
ESM for DHWS	5	
ESM for heating and ventr.		38
Replacement of windows and doors		59
Floor isolation	16	
Roof isolation		49
External walls isolation		53

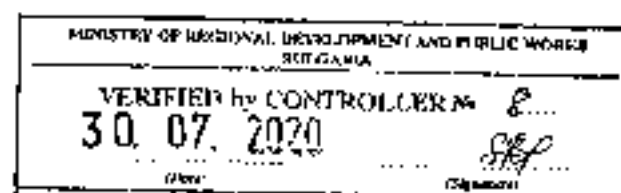


➤ **Investments by types of realized ESM, thousand BGN**

ESM for SL	2 154	
ESM for lighting	990	
ESM for DHWS	109	
ESM for heating and ventil.	854	
Replacement of windows and doors		3 420
Floor isolation	1 205	
Roof isolation		5 074
External walls isolation		6 010

➤ **Fuel and energy saved by types of measures, MWh / year.**

ESM for SL	305	
ESM for lighting	200	
ESM for DHWS	28	
ESM for heating and ventil.	758	
Replacement of windows and doors		2 028
Floor isolation	107	
Roof isolation		1 134
External walls isolation		2 009



➤ **Savings by types of measures, thousand BGN / year.**

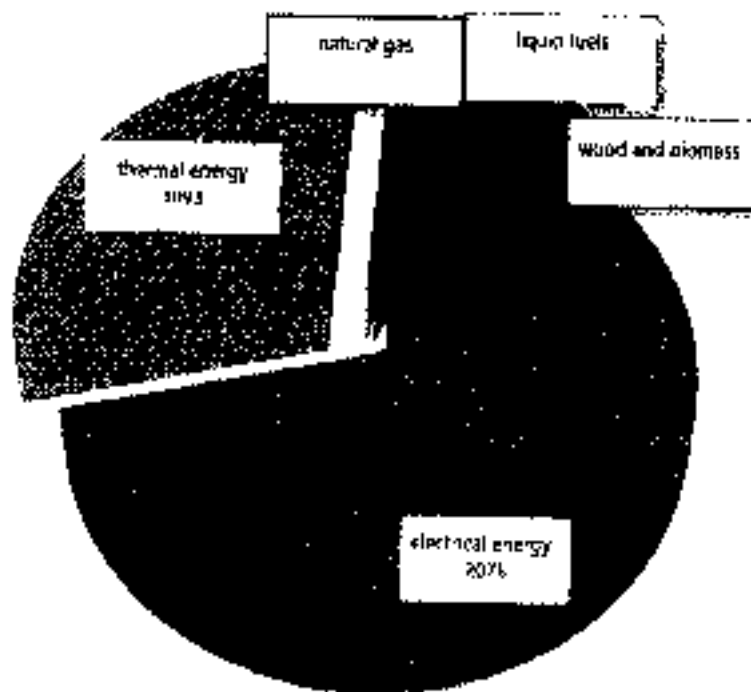
ESM for SL		324
ESM for lighting	2	
ESM heating /ventilation	59	
Replacement of doors and windows	76	
Floor isolation	13	
Roof isolation	68	
External walls isolation	75	

➤ **Saved CO2 emissions by types of implemented measures, tons / year.**

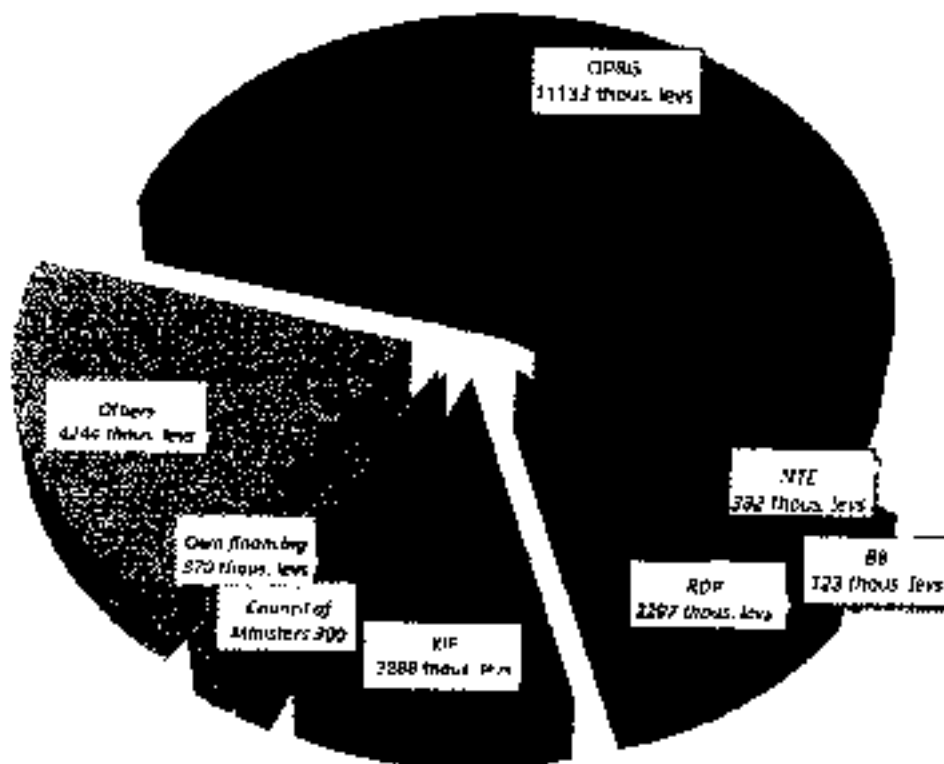
ESM for SL		250
ESM for lighting	113	
ESM for DHWS	28	
ESM for heating and ventil.		335
Replacement of windows and doors		541
Floor isolation	70	
Roof isolation		474
External walls isolation		794



➤ *Types of saved fuels and energies, MWh / year.*



➤ *Sources of funding*



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MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS 35
BULGARIA

VERIFIED by CONTROLLER №. 8

30.07.2020

Day

Signature

OPRG - Operational Program "REGIONS IN GROWTH"

NTE - National Trust Ecofund

BB - Beautiful Bulgaria Project

KIF - Kozludui Investment Fund

RDP - Rural Development Programme

Implemented ESM in 2018 by municipal and district administrations

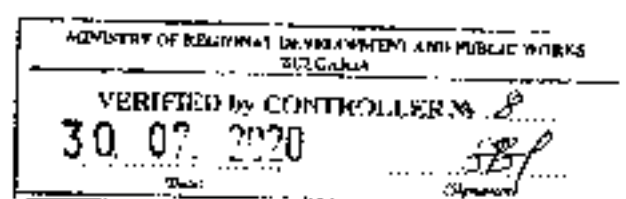
The trend for municipal and district administrations continues in implementation of ESM on building stock. Due to opportunities for financing energy efficiency projects, a significant number of projects for improving the energy efficiency of street lighting (MA), ESM measures for building stock, solar collectors for DHWS, etc. are being implemented.

The declared results from the implementation of the energy efficiency plans are based on the inspection reports, calculations according to the specialized methodologies or the own assessments of the municipal administrations. Some of the submitted reports on the implementation of energy efficiency programs describe attached ESMs, but there is no assessment of their effect.

Implemented ESM in 2018 by districts

PLOVDIV REGION

There are 18 municipal administrations in Plovdiv region/district. In 2018, the ESM on building stock, external SL and use of RES were performed in 7 municipalities



SOUTH CENTRAL REGION

Type	Num. ECM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emissions ton/y
Implemented ESM in buildings *	36	1 831,89	1 295,69	76,57	496,75
MA systems with completed ESM in 2018	2	1 971	204,71	288	167,66
Use of RES	3	163,37	174,7	0	50,66
Total Plovdiv region	41	3 969,26	1 675,10	364,57	715,07

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

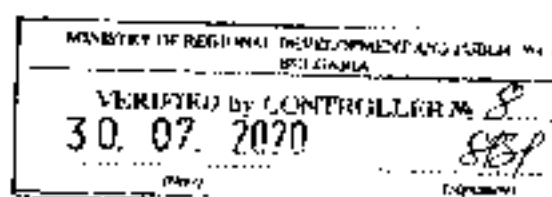
Implementation of 36 ESM in 11 municipal buildings with a total area of 29,606 m²:

- Thermal insulation of external walls - 8 pcs. in the municipalities: Asenovgrad, Karlovo, Parvomay, Plovdiv and Rakovski;
- Thermal insulation of the roof - 6 pcs. in the municipalities: Karlovo, Plovdiv and Rakovski;
- Thermal insulation of the floor - 4 pcs. in the municipalities: Karlovo and Plovdiv;
- Replacement of windows and doors - 8 pcs. in the municipalities: Asenovgrad, Karlovo, Parvomay, Plovdiv and Rakovski;
- ESM of pipe network - 8 pcs. in the municipalities: Karlovo, Plovdiv and Sopot;
- ESM under the DHW system - 3 pcs. in the municipality of Plovdiv;
- ESM for lighting systems - 2 pcs. in the municipalities: Parvomay and Sopot;
- ESM by MA systems - 2 pcs. in the municipalities: Karlovo, Perushtitsa.

In 2018 in Plovdiv region there were no inspections of buildings.



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PAZARDZHIK DISTRICT

In Pazardzhik district there are 12 municipal administrations. In 2018, the ESM on buildings are made in 5 municipalities.

Type	Num. FSM	Investments thous. lev	Saved fuels and energies MWh/y	Savings saved thous. lev	Saved CO2 emissions ton/y
Implemented ESM in buildings *	76	5 878	4 429	1 076	1 298
Use of RES	2	71	20	8	17
Total Pazardzhik district	78	5 949	4 449	1 084	1 315

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

ESM in 16 municipal buildings with a total area of 39 802 m² were implemented:

- Thermal insulation of external walls - 22 pcs. in the municipalities: Panagyurishte, Pazardzhik, Peshtera, Velingrad, Sarnitsa;
- Thermal insulation of the roof - 16 pcs. in the municipalities: Panagyurishte, Pazardzhik, Peshtera, Velingrad, Sarnitsa;
- Thermal insulation of the floor - 6 pcs. in the municipalities: Pazardzhik, Peshtera, Velingrad;
- Replacement of windows and doors - 17 pcs. in the municipalities: Pazardzhik, Peshtera, Velingrad, Sarnitsa;
- ESM of pipe network - 15 pcs. In the municipalities: Panagyurishte, Pazardzhik, Peshtera, Velingrad;
- ESM under the DHWS system - 2 pcs. in the municipality of Panagyurishte;

- ESM for lighting systems - 6 pcs. In the municipalities: Panagyurishte, Velingrad, Sarnitsa.

In 2018, an inspection of 7 buildings in the municipality of Sarnitsa with a total area of 1,487 m².

KARDZHALI DISTRICT

type	Num. EC M	Investment s thous. lev	Saved fuels and energie s	Savings saved thous. lev	Saved CO2 emissio nston/y
Implemented ESM in buildings *	34	2 515	1 724	288	539
Use of RES	2	19	14	3	8
Total district of Kardzhali	36	2 534	1 738	291	547

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

34 ESMs were performed in 6 municipal buildings with a total area of 21,636 m²:

- Thermal insulation of external walls - 6 pcs. in the municipalities of Krumovgrad and Kirkovo;
- Thermal insulation of the roof - 6 pcs. in the municipalities of Krumovgrad and Kirkovo;
- Thermal insulation of the floor - 2 pcs. in the municipalities of Krumovgrad and Kirkovo;
- Replacement of windows and doors - 6 pcs. in the municipalities of Krumovgrad and Kirkovo;

- ESM for heat generation and cooling - 2 pcs. in the municipalities of Krumovgrad and Kirkovo;
- ESM of pipe network - 11 pcs. in the municipalities of Krumovgrad and Kirkovo;
- ESM under the DHW system - 2 pcs. In the municipality of Krumovgrad;
- ESM for lighting systems - 1 pc. in the municipality of Krumovgrad.

In 2018 in the district of Kardzhali no inspections of buildings were carried out.

HASKOVO REGION

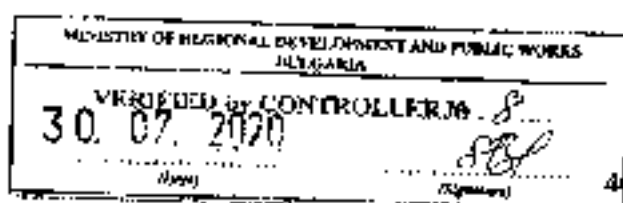
There are 11 municipal administrations in Haskovo district. In 2018, the ESM for building stock and SL were performed in municipalities 3 pieces.

Type	Num ESM	Investments thous. BGN	Saved fuels and energies MWh/ year	Savings saved thous. BGN	Saved CO2 emission ton/year
Implemented ESM in	135	9 192,24	7 196,76	1 462,99	2 376,83
SL systems with implemented	1	1	3,5	-	2,87
Use of RES	10	695,80	569,74	116,95	145,57
Total Haskovo district	146	9 889,1	7 770	1 579,94	2 525,27

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

135 ESM were performed in 29 municipal buildings with a total area of 82,630 m²:

- Thermal insulation of external walls - 25 pcs. in the municipalities of Stambolovo and Dimitrovgrad;



- Thermal insulation of the roof - 8 pcs. in the municipality of Dimitrovgrad
- Replacement of windows and doors - 27 pcs. in the municipalities of Stambolovo and Dimitrovgrad;
- ESM of pipe network - 50 pcs. in the municipality of Dimitrovgrad;
- ESM under the DHW system - 10 pcs. in the municipality of Dimitrovgrad;
- FSM for lighting systems - 25 pcs. in the municipality of Dimitrovgrad;
- ESM by MA systems - 1 pc. in the municipality of Stambolovo.

In 2018 an inspection of 4 buildings in the municipality of Harmanli with a total area of 3,235 m² was carried out.

SMOLYAN REGION

In Smolyan district there are 10 municipal administrations. In 2018, ESM on buildings and external SL were carried out in 5 municipalities.

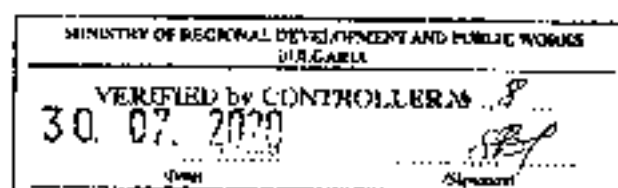
Type	Num ESM	Investments thous. BGN	Saved fuels and energie MWh/y	Savings saved thous. BGN	Saved CO2 emission ston/year
Implemented ESM in buildings *	19	2171	986	171	545
SL systems with Implemented ESM in 2018	1	93	N/A	N/A	N/A
Total Smolyan district	20	2264	986	171	545

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)

19 ESM were performed in 8 municipal buildings with a total area of 19,776 m²:



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- Thermal insulation of external walls - 3 pcs. in the municipalities of Smolyan and Devin;
- Thermal insulation of the roof - 2 pcs. in the municipality of Smolyan;
- Replacement of windows and doors - 8 pcs. in the municipalities of Smolyan, Devin and Zlatograd;
- ESM of pipe network - 6 pcs. in the municipalities of Smolyan and Devin;
- ESM by MA systems - 1 pc. in the municipality of Chepelare

In 2018, an inspection of 5 buildings in the municipalities of Banite and Chepelare was carried out with a total area of 10,461 m². An inspection of 3 systems for outdoor artificial lighting in the municipality of Chepelare was performed.

Summarized assessment of the effect of the measures implemented in 2018 to increase energy efficiency in the South Central Planning Region.

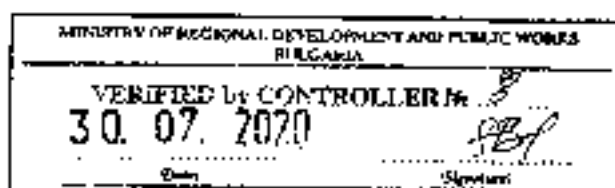
In 2018, the FSM on building stock and external SL were performed in 20 pieces. municipal administrations.

Type	Num. ESM	Investments thous. BGN	Saved fuels and energies MWh/y	Savings saved thous.BGN	Saved CO2 emissions ton/year
Implemented ESM in buildings *	298	21 586	15 548	3 059	5 201
SL systems with completed ESM in 2018	4	2 067	1 548	288	171
Use of RES	17	948	779	127	221
Total	319	24 602	16 535	3 474	5 592

* ESM for enclosing elements, heating and ventilation, air conditioning, measuring and automation systems, heating and lighting installations (without gasification and use of RES)



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BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES

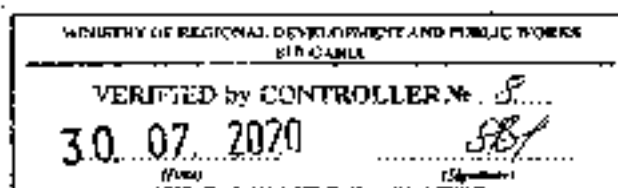
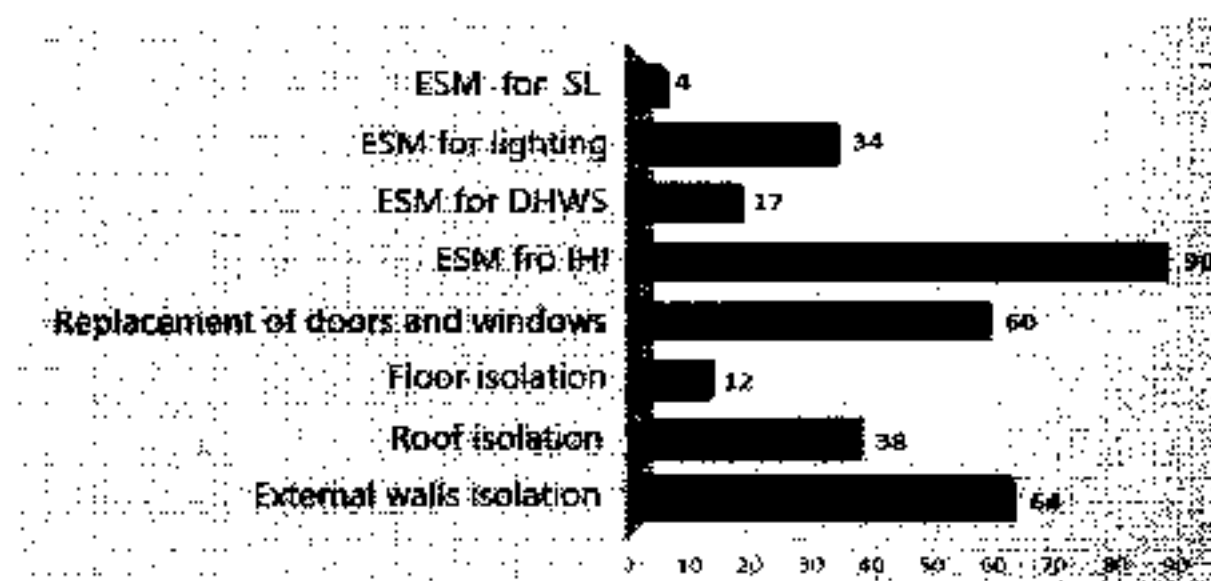


Total effect of the realized ESMs in 2018 in the South Central Region:

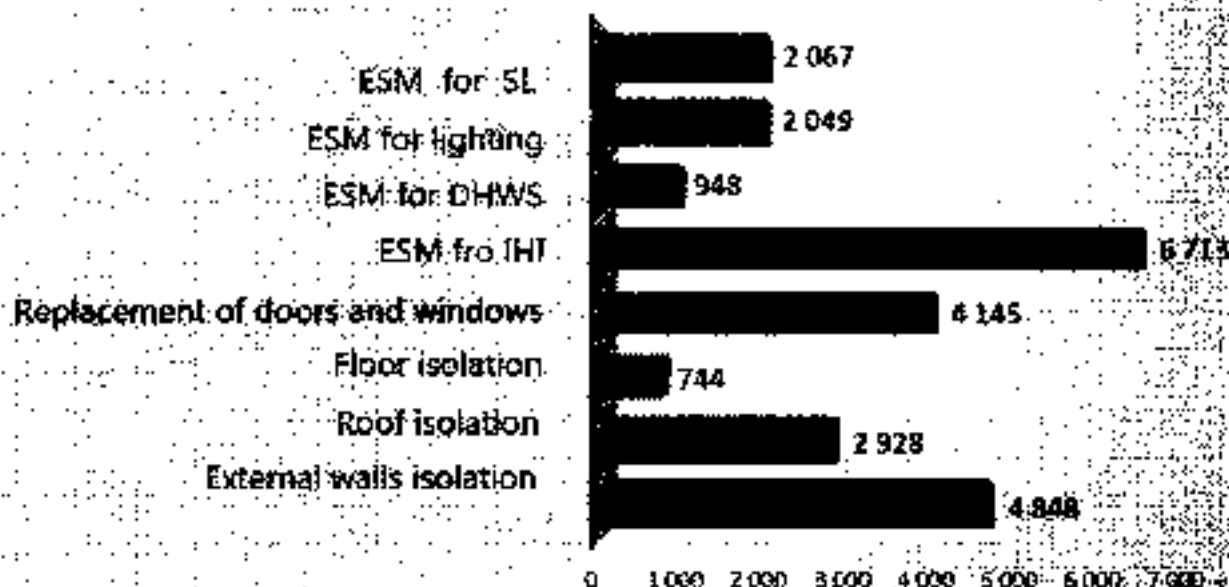
- 16,535 MWh / year. saved fuels and energy
- BGN 3,474 thousand / year. savings
- 5,592 tons / year. saved CO2 emissions
- BGN 24.602 million investments.

Assessment of the effect of the measures implemented in 2018 to increase energy efficiency in the South Central Region in graphs.

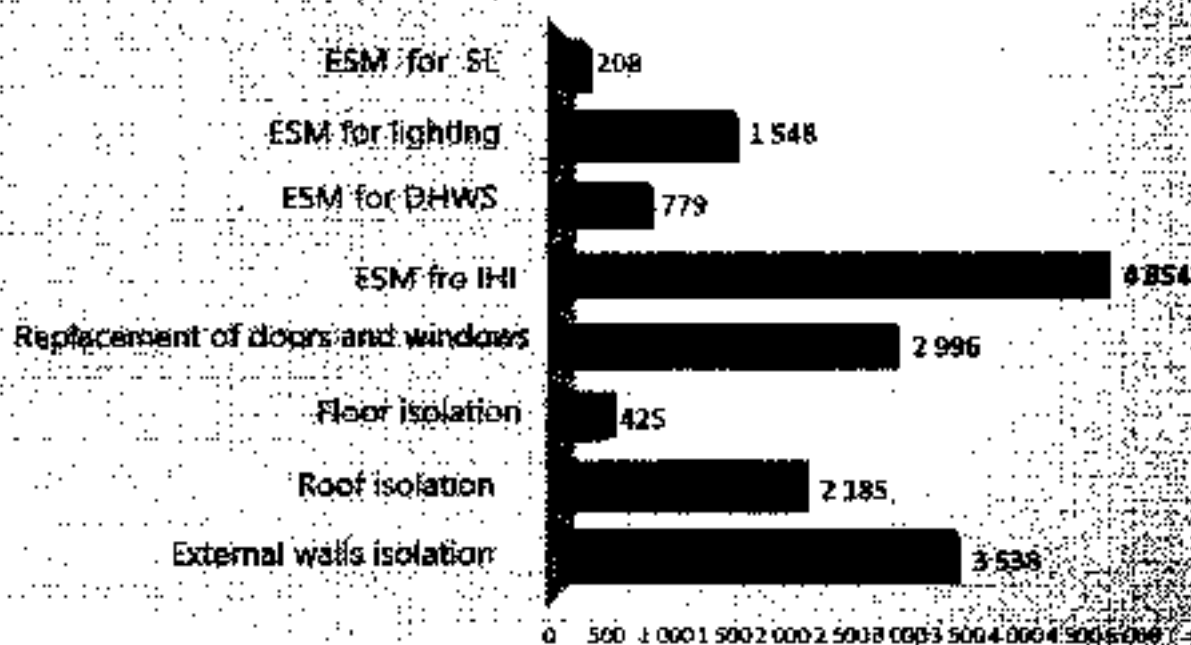
➤ **Number of implemented measures by types**



➤ Investments by types of implemented measures in thousand BGN



➤ Fuel and energy saved from implemented measures in MWh / year.



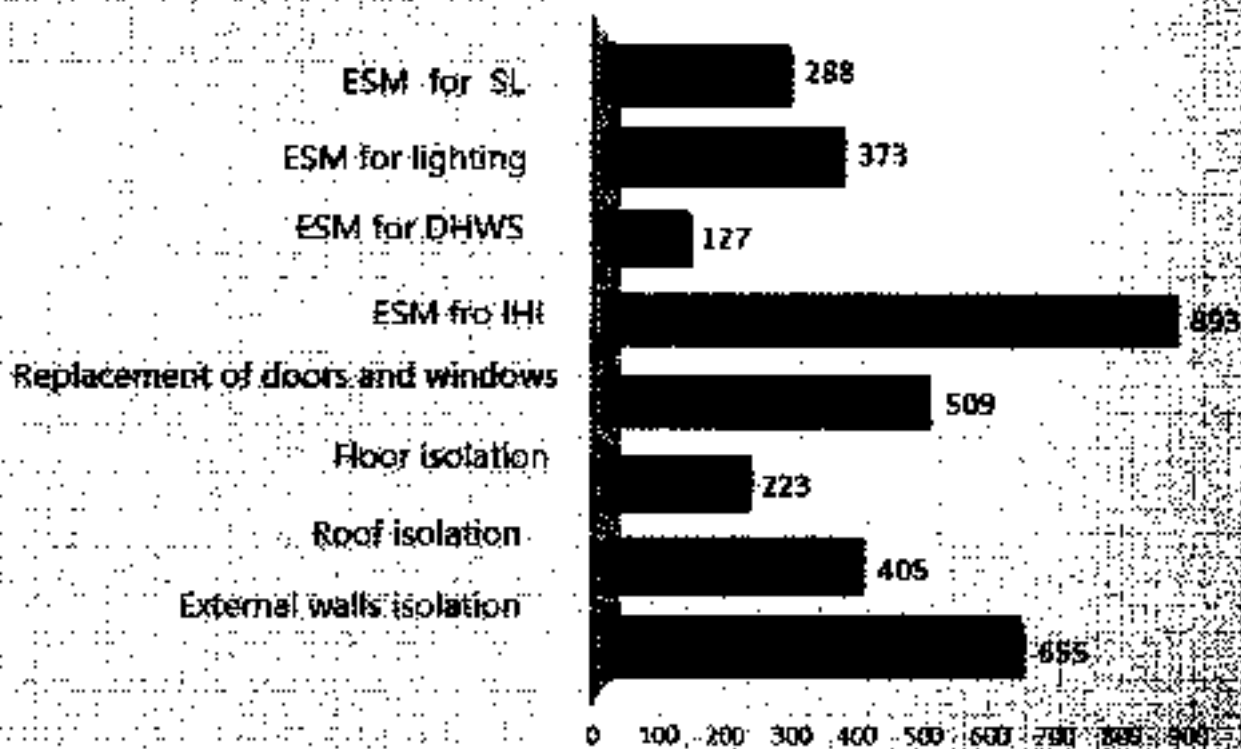
MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS
BULGARIA

VERIFIED by CONTROLLER: *S.*
30.07.2020 *S.P.*

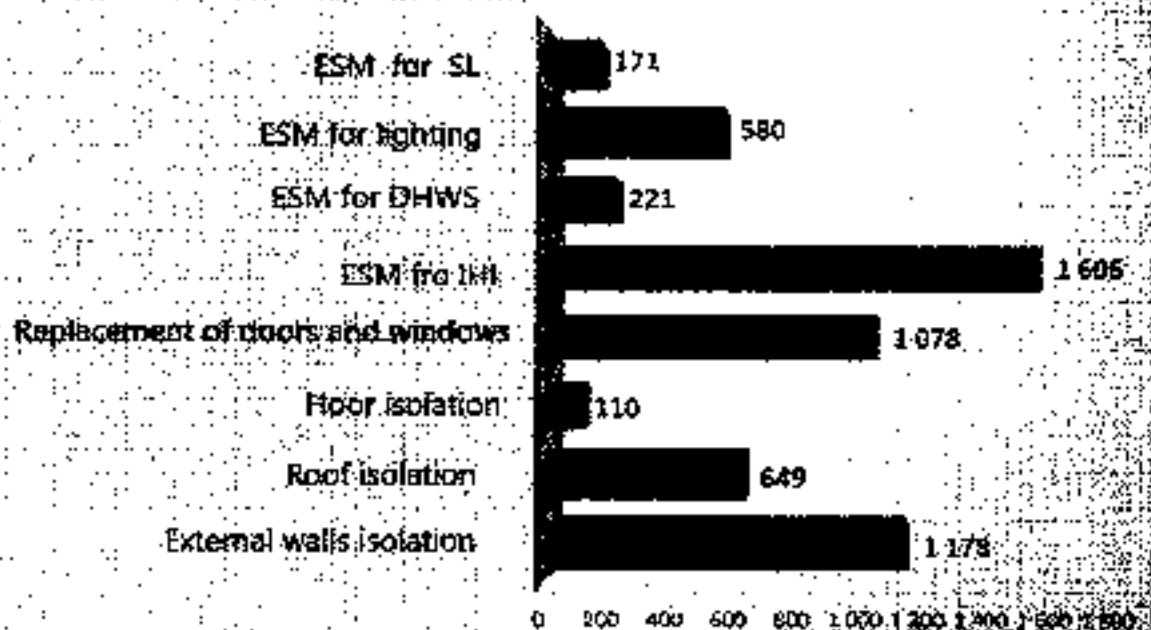
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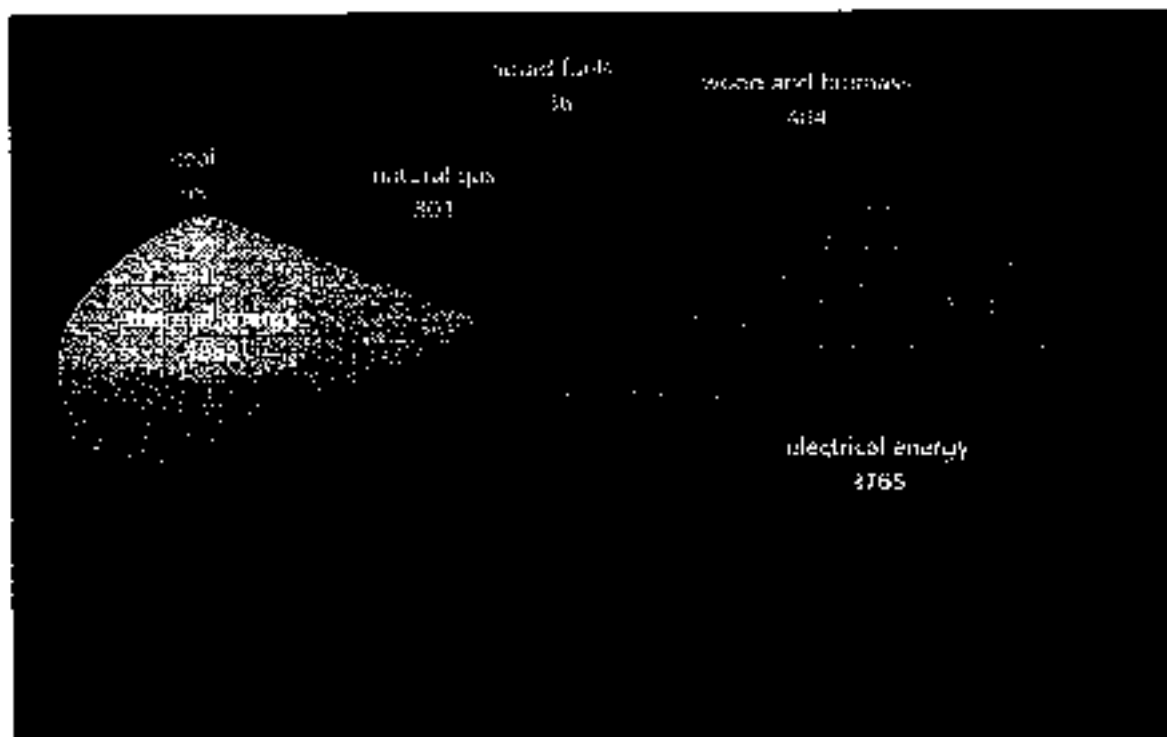
➤ Funds saved by types of implemented measures, thousand BGN



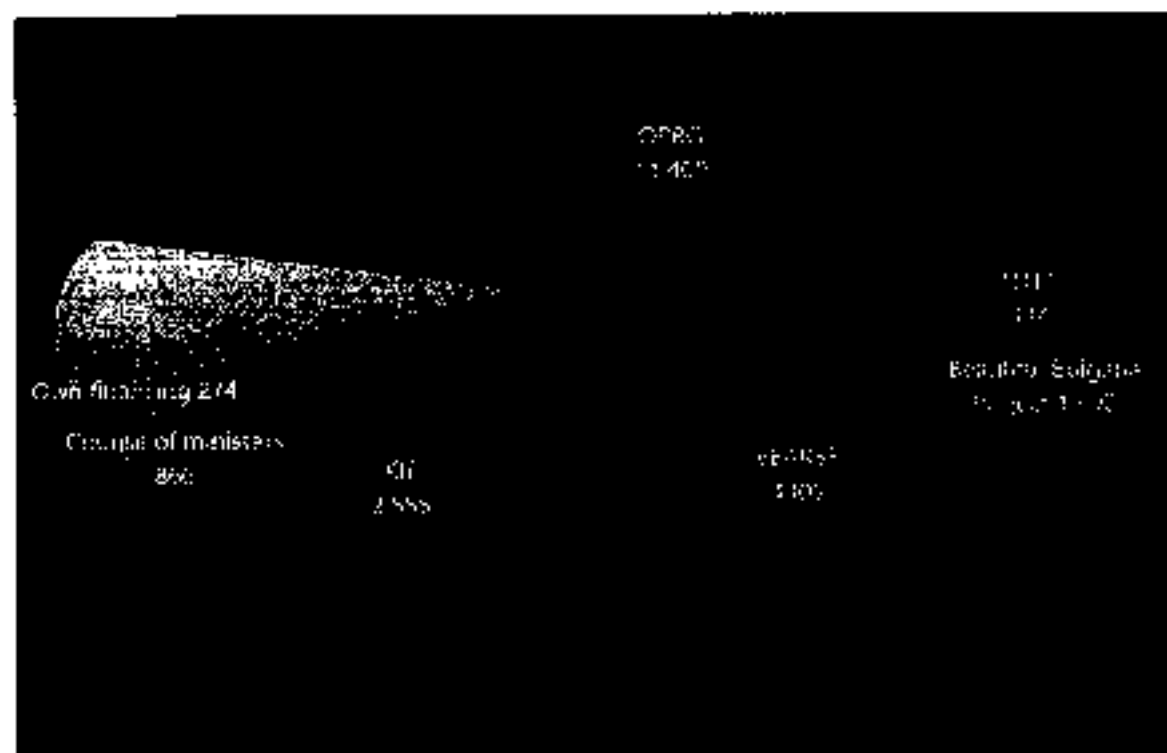
➤ Saved CO2 emissions by types of implemented measures, tons



➤ **Types of saved fuels and energies, MWh**



➤ **Sources of funding thousand BGN**



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BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES

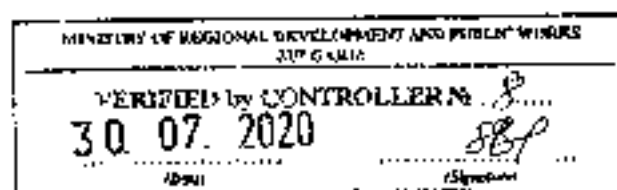
MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS BULGARIA	
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As sources of funding for the implementation of the ESM in 2017, the municipal and district administrations from the PIU RC have indicated:

- OP Regional Development (OPRD);
- National Trust Profund (NIEI);
- Beautiful Bulgaria Project (CB);
- FFEVI;
- Kozloduy International Fund (IFC);
- Council of Ministers (CoM);
- Own financing (SF);
- Others.

Audited buildings and systems for the SL in 2018 on the territory of the South-Central Region of Bulgaria by regions/districts

District	Number of Municipalities done audit of buildings	Number Audit buildings	Total area Audit buildings (m2)	Investments thous. BGN	Saved fuels and energies MWh/y	Savings saved thous. BGN	Saved CO2 emissions ton/year
Pazardjik	1	2	1487	N/A	N/A	N/A	N/A
Haskovo	1	4	6536	N/A	N/A	N/A	N/A
Smolyan	2	5	10461	N/A	N/A	N/A	N/A
Total	4	11	15783	N/A	N/A	N/A	N/A
SCR							



Implemented ESM for the period 2016-2019 by regions/districts

PLOVDIV REGION

	2016 r.	2017	2018	2019
Number of ESM	3	4	4	11
Investments thous. lev	2 575	3 444	3 969	5 542
Saved fuels and energies MWh/y	1 390	3 623	1 675	1 075
Savings saved thous. lev	1 7	3 7	3 65	3 52
Saved CO2 emissions ton/y	45	1 256	215	1 078

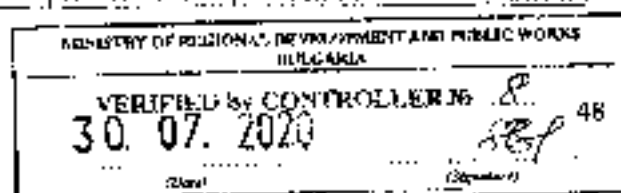
The reported results show that in Plovdiv district, after the increase in 2017 there was an increase in the number of ESM and related indicators, except for the savings, in 2018 some of them decreased. In 2019, the number of completed ESMs increased sharply. Investments maintain the upward trend over the years. Fuel savings have increased compared to 2018, but are lower than the values for 2017. Savings in 2018 have increased dramatically compared to the previous two years. In 2019 there is quite slight decline in savings compared to 2018. Savings emissions increased in 2017 compared to 2016, followed by a decline in 2018. In 2019, there is again an increase and the highest values of savings emissions for the period.

PAZARDZHIK DISTRICT

	2016	2017	2018	2019
Number of ESM	28	17	78	41



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRE for
SME and MEDIUM-SIZED ENTERPRISES



Investments (thousands BGN)	681	765	5 949	4 431
Saved fuels and energies (MWh/y)	638	567	4 449	2,221
Savings saved (thousands BGN)	52	72	1 084	167
Saved CO2 emissions (ton/y)	116	311	1 315	508

From the reported results it is clear that in Pazardzhik district in 2018 there are the highest values of all indicators. In 2019, they decreased compared to 2018, but still remain higher than in 2016 and 2017.

KARDZHALI DISTRICT

	2016	2017	2018	2019
Number of ESM	54	7	36	61
Investments (thousands BGN)	2 728	362	2 534	6 830
Saved fuels and energies (MWh/y)	548	N/A	1 738	1 247
Savings saved (thousands BGN)	116	N/A	291	N/A
Saved CO2 emissions (ton/y)	170	N/A	547	410

In Kardzhali District, due to the lack of any of the data for 2017 and 2019, there is no possibility for a correct comparison of the results. It can be said that after a significant reduction in the number of ESMs and investments in 2017, in 2018 the indicators will increase. In 2019, the number of ESMs and investments doubled compared to 2018, but the values of saved fuels and emissions are lower compared to 2018.

HASKOVO REGION

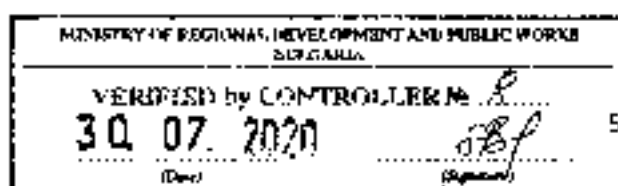
	2016	2017	2018	2019
Number of ESM	131	57	146	18
Investments thousands BGN	11 025	5 253	9 886	717
Saved fuels and energies MWh/yr	8 673	1 436	7 770	12
Savings saved thousands BGN	1 404	247	1 583	N/A
Saved CO2 emissions ton/ton/y	3 138	407	2 525	4

After a significant decrease in 2017 of the realized ESM and all other indicators related to them, in 2018 in Haskovo district there is an approximate recovery of the 2016 values of the indicators. In 2019, the decline in the compared indicators is serious and the values of all indicators are the lowest for the period 2016-2019.

SMOLYAN REGION

	2016	2017	2018	2019
Number of ESM	62	52	20	17
Investments thousands BGN	4 513	2 777	7 764	2 286
Saved fuels and energies MWh/yr	1 108	861	986	1 134
Savings saved	243	131	171	92
Saved CO2 emissions ton/ton/y	449	271	545	305

In Smolyan district, the trend of 2017 to reduce the number of ESM continues. In the last year, investments have increased slightly compared to 2018, but are lower than in 2016 and 2017. The saved fuels have the highest values for 2019. In contrast, the values of saved funds and saved emissions are decreased compared to 2018.



TOTAL FOR SOUTH CENTRAL REGION

	2016	2017	2018	2019
Number of ESM	309	179	319	251
Investments thousands BGN	21 484	17 597	24 602	21 687
Saved fuels and energies MWh/y	11 591	6 486	16 535	6 563
Savings saved	1 985	488	3 474	612
Saved CO2 emissions ton/y	4 141	2 246	5 592	2 605

The data for the region show that after a significant decline in the implementation of the EJM and related indicators in 2017, in 2018 the indicators have doubled and have the highest values for the period under review. In 2019, compared to 2018, all indicators have decreased their values, but remain higher than those for 2017.

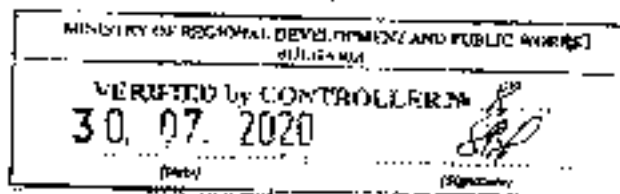
Audit for outdoor artificial lighting systems in the South Central Region of the period 2016-2019.

	2016	2017	2018	2019
System audits for SL	72	3	N/A	2154
Necessary Investments thousands BGN	7	4	N/A	3016
Saved fuels and energies MWh/y	1	N/A	N/A	324
Savings saved Thousands BGN	0			
Saved CO2 emissions ton/y				

The number of audited SL systems remained at the level of 2017 and is twice less than the number of audited SL in 2016. In 2019, the number of ESMs in external SL systems has increased compared to 2017 and 2018. In 2019, the values of



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES



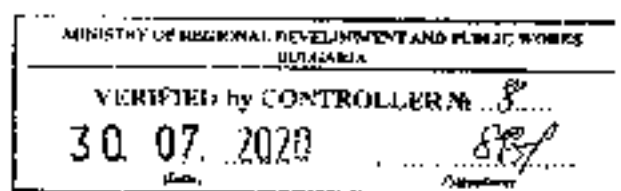
investments and savings have increased many times, but the values of fuel savings and emissions savings are more -smaller than those for 2017.

Audited buildings in 2019 in the South Central Region

The assessment of the expected effect of the ESMs prescribed in 2019 in reports from inspections of buildings owned by municipal administrations is shown in the following table:

Region/ district	Number of Municipalities done audit of buildings	Number Audit buildings	Total area Audit buildings (m ²)	Investment s thous.BGN	Saved fuels and energies MWh/y	Savings saved thous. BGN	Saved CO ₂ emissions ton/year
Haskovo	1	12	17250	3 142,46	2 180,41	471,76	658,48
Smolyan	3	6	11498	1 258	758,4	114	384,58
Total SCR	4	18	28748	4 400,46	2 948,81	585,76	1 043,06

The inspected/audited buildings are in the region of Haskovo in Haskovo municipality and in the district of Smolyan - municipalities of Devin, Chepelare and Banite.



Expected effect of the prescribed ESMs
2019 r. SCR:

- 2 949 MWh/y Saved fuels and energy
- 585 thous./y savings
- 1 043 ton/y saved CO₂
- 4 400 thous. lev investments

3.2 Mapping of policies

3.2.1 Relevant EU Directives

To achieve the set national energy efficiency target of 27% by 2030, will be implemented existing as well as additional policies and measures:

- **Encouraging public buildings to serve as an example**

According to the provisions of Directive 2010/31 / EU on the energy performance of buildings and Directive 2012/27 / EU on energy efficiency, public authorities at national, regional and local level should serve as an example in terms of energy efficiency. In this regard, the Republic of Bulgaria has set a more ambitious goal for the renovation of the buildings owned and used by the central administration as the legal requirement set in Art. 23, ZEE, 1 of the Energy Act, is in all heated and / or cooled buildings - state property, used by the state administration to take annual measures to improve the energy performance of at least 5% of the total area. The reason for imposing a more ambitious goal is not only the need to reduce energy consumption in buildings due to its long-term impact, but also the stimulating role of buildings owned by public authorities, as they represent a significant share of the building stock, and have a high degree of visibility in public life.

- **Energy efficient public procurement**

According to Art. 30a of the Energy Act, when conducting public procurement, public contracting authorities will purchase only products, services and buildings with high energy efficiency indicators, including:

1. products meeting the criterion of belonging to the highest possible class of energy efficiency;
2. office equipment, defined and meeting the requirements of application "B" of the Agreement between the Government of the United States of America and the European Union on the coordination of energy-efficiency labeling programs for office equipment (OJ L 63/7 of 6 March 2013);



3. car tires that meet the criterion of the highest energy efficiency class for fuel use as defined in Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labeling of tires according to fuel efficiency and other essential parameters (OJ L 342/46 of 22 December 2009), hereinafter "Regulation (EC) No 1222/2009";
4. buildings that meet the minimum requirements for energy characteristics, certified by a certificate for energy characteristics.

- **Energy audits and management systems**

All are subject to mandatory EE testing:

1. enterprises for production, which are not small and medium enterprises in the sense of art. 3 of the Small and Medium Enterprises Act;
2. enterprises for provision of services, which are not small and medium enterprises in the sense of art. 3 of the Small and Medium Enterprises Act;
3. industrial systems (PS), whose annual energy consumption is over 3000 MWh;
4. systems for external artificial lighting, located in a settlement with population over 20,000 inhabitants

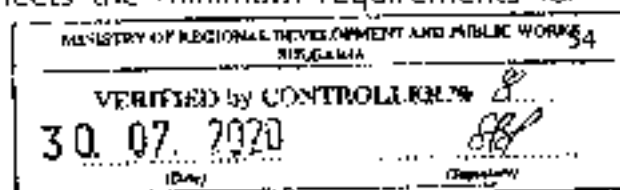
The examination is performed at least once every 4 years.

Undertakings and owners of power plants that implement an energy or environmental management system subject to certification by an independent body for compliance with European or international standards shall be exempted from the mandatory EE inspection requirements, provided that the system they apply to management includes an energy audit of the relevant plant or industrial system.

The application of an energy or environmental management system and evidence that the management system they apply meets the minimum requirements for



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRES for
SMALL and MEDIUM-SIZED ENTERPRISES



energy audits shall be provided to the SEDA within one month of the acquisition of the certificate.

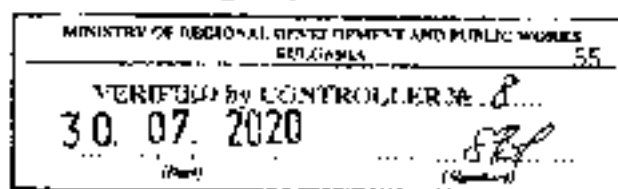
The owners of enterprises, vehicles and systems for outdoor artificial lighting are obliged to perform EE management. EE is managed by maintaining databases on monthly production and consumption by type of energy, annually preparing analyzes of energy consumption, as well as by implementing other measures that lead to energy savings. For the management of EE, the obligated persons shall prepare annual reports according to a template prepared by SEDA, which shall be submitted to the Agency no later than March 1 of the year following the reporting year.

In Bulgaria, a system for audit / inspection for EE and certification of buildings in operation with an area of over 250 m² has been introduced, in implementation of the provisions of Directive 2010/31 / EU. The certificate for energy performance of a building in operation is updated when performing the following activities leading to a change in the energy performance of the building:

1. reconstruction;

2. reconstruction, major renovation or major repairs, when more than 25% of the area of the external enclosing structures and elements of the building are covered. The owners of buildings with an area of more than 250 m² are obliged to implement the measures for reaching the minimum required class of energy consumption, prescribed by the first inspection, within three years from the date of acceptance of the results of the survey.

The owners of public service buildings - state and municipal administrations, are obliged to perform EE management. The management is carried out through the implementation of programs, activities and measures to increase EE and annual analysis of energy consumption. For the management of EE, similar to business owners, building owners also prepare annual reports according to a template prepared by SEDA, and the reports are submitted to the Agency no later than 1 of



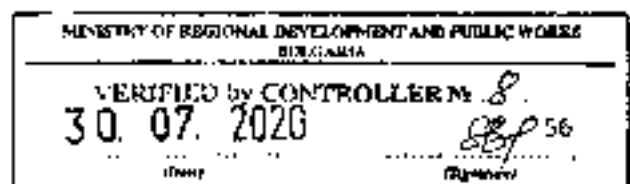
March of the year following the reporting year.

The national legislation also provides for an inspection for EE and optimization of the operation of hot water boilers and air conditioning systems in public buildings. Depending on the installed capacity and the type of energy used, heating installations with hot water boilers are subject to mandatory periodic inspection for EE once on:

1. every 6 years - for heating installations with natural gas hot water boilers with a single nominal power over 20 kW up to and including 100 kW;
2. every 4 years - for heating installations with hot water boilers on liquid or solid fuel with single nominal power over 20 kW up to and including 100 kW, and on natural gas with single nominal power over 100 kW;
3. every two years - for heating installations with hot water boilers on liquid or solid fuel with a single nominal power over 100 kW.

Air conditioning systems in buildings with a nominal electrical power over 12 kW are subject to mandatory periodic inspection for EE once every 4 years.

A performed inspection for energy efficiency or application of a certified energy or environmental management system is one of the criteria to be met by the enterprises applying for aid under Ordinance № E-PA-04-06 of 28.09.2016 to reduce the burden related to the cost of energy from renewable sources (Ordinance). These companies should also carry out energy efficiency management and submit a report to the Sustainable Energy Development Agency. The ordinance was issued on the grounds of Art. 4, paragraph 2, item 21 of the Energy Act, in accordance with the Environmental Aid Guidelines. It regulates the terms and conditions for granting aid to undertakings in sectors at risk due to the costs arising from the financing of support for energy from renewable sources in order to maintain the competitiveness of those undertakings.



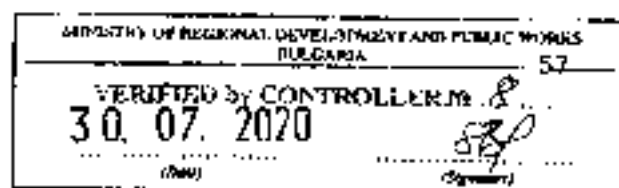
3.2.2 National Implementation of EU Directives and other relevant National Regulation

The Integrated National Plan in the Field of Energy and Climate until 2030 of the Republic of Bulgaria (INPEC) has been prepared in accordance with the requirements of the Energy Union Governance Regulation (REGULATION) (EU) 2018/1999 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December on the governance of the Energy Union and climate action, amending Regulations (EC) № 663/2009 and (EC) № 715/2009 of the European Parliament and of the Council, Directives 94/22 / EC, 98 / EC 70 / EC, 2009/31 / EC, 2009/73 / EC, 2010/31 / EU, 2012/27 / EU and 2013/30 / EU of the European Parliament and of the Council, Directives 2009/119 / EC and (EU) 2015/652 of the Council and repealing Regulation (EU) № 525/2013 of the European Parliament and of the Council), according to which the Member States of the European Union must submit the draft to INPEC by 31.12.2018.

INPEC defines the main goals, stages, means, actions and measures for the development of our national policy in the field of energy and climate, in the context of the European legislation, principles and priorities for the development of energy.

The main objectives set out in this Plan are:

- stimulating low-carbon development of the economy;
- competitive and secure energy;
- reduction of dependence on imports of fuels and energy;
- guaranteeing energy at affordable prices for all consumers. National energy priorities can be summarized as follows:
 - Increasing energy security through sustainable energy development;
 - Development of an integrated and competitive energy market;
 - Usage and development of renewable energy, according to the available resources, network capacity and national specifics;
 - Increasing energy efficiency through the development and application of new



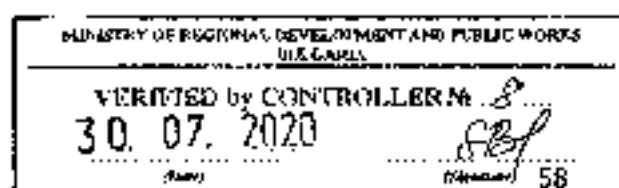
technologies to achieve modern and sustainable energy;

- Consumer protection by ensuring fair, transparent and non-discriminatory conditions for the use of energy services.

The Integrated national plan of the Republic of Bulgaria is in compliance with the main strategic documents at European and national level.

The following national strategy documents were used for its preparation (and draft documents in the process of coordination):

- ✓ Energy strategy of the Republic of Bulgaria until 2020;
- ✓ National strategy for development of the mining industry until 2030;
- ✓ Strategy for Bulgaria's participation in the Fourth Industrial Revolution;
- ✓ Long-term strategy for rehabilitation of the national building stock from residential and administrative buildings (public and private);
- ✓ Innovation strategy for intelligent specialization;
- ✓ National program for energy efficiency of multifamily residential buildings;
- ✓ National policy framework for the development of the market of alternative fuels in the transport sector and for the deployment of the respective infrastructure;
- ✓ National action plan to promote production and accelerated entry of ecological vehicles, including electric mobility in Bulgaria for the period 2012-2014;
- ✓ National Action Plan for Renewable Energy;
- ✓ National Action Plan for Energy Efficiency 2014 - 2020;
- ✓ National Action Plan for energy from forest biomass 2018-2027;
- ✓ National Strategy for Adaptation to Climate Change of the Republic of Bulgaria and Action Plan (draft version);
- ✓ Third National Climate Change Action Plan (2013-2020).



3.3 Interventions and Initiatives

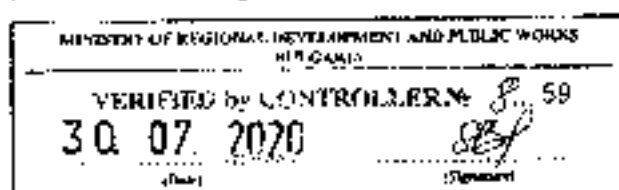
- **Consumer information and training programmes**

The measure aims to raise consumer awareness on the electricity, heat and natural gas they use, as well as the benefits of implementing EE measures. Energy retailers publish on their pages information on how to save energy and maintain an online archive of electronic invoices. The companies have EE consultants who help customers reduce their energy consumption without making expensive investments and complex repairs.

Apart from the fact that the measure is applied by the energy traders in the country as part of their information campaigns and initiatives, its implementation is additionally supported by the regional and municipal administrations in the country. Various consumer awareness initiatives are included in the EE programs of regional and local authorities prepared in fulfillment of their obligations under Art. 12 of the ZEE. The initiatives include the creation of consumer councils, the organization of a consumer day, as well as numerous campaigns in the district and municipal centers, where customers can learn about ways to save energy.

The information campaigns, as well as the implementation of various behavioral measures are included as eligible measures in Ordinance № C-PA-04-3 of 4 May 2016 on the eligible measures for the implementation of energy savings in final consumption, the ways of proving the achieved energy savings, the requirements for the methodologies for their evaluation and the ways for their confirmation.

To support the implementation of the measure, specialized methodologies for assessment of energy savings are developed after the application of various behavioral measures under Ordinance № C-PA-04-3 of May 4, 2016. The methodologies are prepared according to a model approved in the Ordinance and pass through discussion by specially formed by SEDA expert groups, again by the order of the same Ordinance.



- **Providing qualification, accreditation and certification schemes**

The conditions and the procedure for acquiring and recognizing a qualification for performing an Ee inspection of buildings and industrial systems, and certification of buildings are regulated in the ZEE. The activities for Ee inspection, certification of buildings, preparation of conformity assessment of investment projects and preparation of assessments for energy savings are performed by persons entered in public registers maintained by SEDA. The ZEE provides for the requirements to be met by the persons in question, as these requirements are detailed at the by-law level in Ordinance № RD-16-301 of 10 March 2014 on the circumstances subject to entry in the registers of persons conducting inspections and certification of buildings and inspection for energy efficiency of industrial systems, the procedure for obtaining information from the registers, the conditions and the procedure for acquiring qualification and the necessary technical means for carrying out the inspection and certification activities.

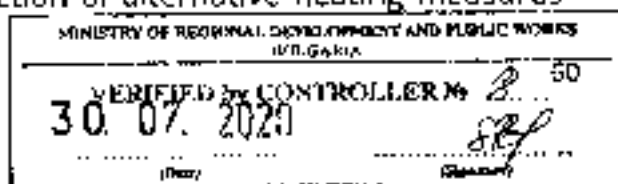
The persons entered in the public register of SEDA have a certificate for successfully passed an examination for raising the qualification for carrying out the activities for inspection and certification of buildings and inspection for energy efficiency of industrial systems.

- Mandatory phasing out of solid fuel heating appliances that do not meet the requirements of the Ecodesign Regulations (EU) 2015/1185 and (EU) 2015/1189 and their replacement with other heating means;

The draft National Program for Improving Atmospheric Air Quality 2018-2020 includes a measure in the field of domestic heating - mandatory phasing out in the period 2020-2024 of solid fuel stoves and boilers that do not meet the requirements of the Ecodesign Regulations and the introduction of alternative heating measures



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRES for
SMALL and MEDIUM-SIZED ENTERPRISES



to contribute by 78% of the expected reduction of PM10 emissions from the domestic heating sector. The ultimate goal of the measure is the phasing out of inefficient solid fuel appliances.

4. Policy – makers and Public Authorities Planning, Promoting and Implementing Initiatives of Improving Energy Efficiency in Plovdiv Region

ENERGY EFFICIENCY POLICIES

Directive 2012/27 / EU on energy efficiency (EE) aims to establish a common framework for the promotion of EE in the EU in order to ensure that the 20% energy savings target in PEC is met by 2020, and to create the conditions to improve energy efficiency. The measures are aimed at using the potential for energy savings in the entire range from energy production, transmission and distribution to FCC in buildings and industry; overcoming regulatory and non-regulatory barriers to the market, and raising consumer awareness; setting national targets for energy efficiency by 2020. The main points of Directive 2012/27 / EU have been transposed into national legislation through the adoption of the new Energy Efficiency Act, published in the State Gazette, issue no. 35 of 15.05.2015

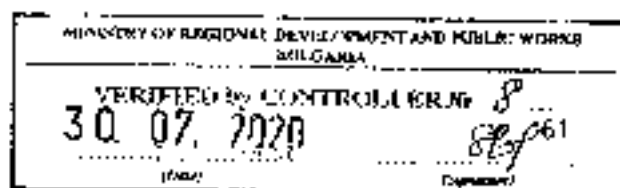
The energy policy of the Republic of Bulgaria is in line with the main objectives of the energy policy of the European Union for energy security, competitiveness and sustainable development. The Energy Strategy of the Republic of Bulgaria until 2020 states that "energy efficiency has the highest priority in the country's energy policy". On this basis, ambitious targets have been set for improving energy efficiency.

NATIONAL ENERGY EFFICIENCY GOALS BY 2020

The National Energy Efficiency Action Plan sets the following indicative national targets for energy savings by 2020:



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM ENTERPRISES



- Energy savings in PEC - 716 Ttoe / year,
- Energy savings in PEC - 1590 Ttoe / year, of which 169 Ttoe / year, in the processes of energy conversion, transmission and distribution.

The additional energy savings in QES are determined by the implementation of a strong policy for energy efficiency and optimal absorption of additional financial resources available from various sources in Bulgaria, namely:

- European funds and programs (for the programming period 2014-2020);
- Obligated persons (based on the energy efficiency obligations scheme of energy traders);
- Local sources;
- State budget.

The implementation of the above-mentioned indicative national targets for energy savings and energy efficiency by 2020 will reduce the PEP in 2020 from 18,460 ha in the reference scenario to 16,870 Ttoe.

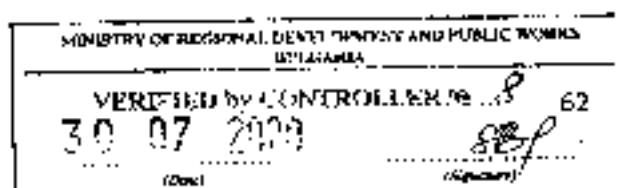
The indicative national target for energy efficiency is calculated on the basis of the implementation of the above-mentioned targets for energy savings and is defined as a reduction of the PEI of Bulgaria by 2020 by 41% compared to its level in 2005.

ADDITIONAL ENERGY EFFICIENCY OBJECTIVES

In compliance with the requirements of the Energy Efficiency Act (EEA) and in accordance with the provisions of Directive 2006/32 / EC on energy end use efficiency and energy services, Bulgaria has adopted a national indicative target for energy savings by 2016 in the amount of less than 9% of the average QES for the period 2001-2005, ie for a period of nine years. In this regard, three-year National Action Plans in the field of EE - First (2008-2010) and Second (2011-2013) were developed and introduced, containing specific measures to improve energy efficiency in final energy consumption.



REGIONAL DEVELOPMENT AGENCY with
BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES



In accordance with the provisions of the Energy Efficiency Act, the national energy savings target was distributed as individual energy savings targets between three groups of obligors:

- Energy traders;
- Owners of public service buildings in operation, with a total built up area of over 500 m², and from 9 July 2015 - over 250 m²;
- Owners of industrial systems with annual energy consumption over 3000 MWh.

The threshold for the group of energy traders who had individual energy savings targets and could apply measures in all sectors was the equivalent of 75 GWh or more of energy delivered annually to end users.

Directive 2012/27 / EU, adopted in 2012, establishes a new scheme for energy efficiency obligations for energy traders, which differs from the previous national scheme.

With the new Energy Efficiency Act (adopted and published in the State Gazette №35 / 15.05.2015, the obligated persons are only the final energy suppliers, which carry out:

- sale of electricity to end users more than 20 GWh per year;
- sale of heat to end users more than 20 GWh per year;
- sale of natural gas to end users more than 1 million m³ per year;
- sale of liquid fuels to end users - more than 6.5 thousand tons of liquid fuels per year, excluding fuels for transport purposes;
- solid fuel traders who sell to end users more than 13 thousand tons of solid fuels per year.

In order to achieve their individual goals, taxpayers can take energy saving measures in all sectors - industry, transport, households, trade, agriculture, forestry and fisheries, services and more.



In 2016, the analysis of the implementation of the national scheme for energy efficiency obligations showed that:

- Fuel and energy traders covered by the national energy efficiency obligation scheme are expected to cover no more than 60% of savings obligations.
- In the period 2010-2016, Bulgaria had a national scheme for energy efficiency obligations, covering more debtors - owners of public buildings and owners of industrial systems
- In 2015, a National Energy Efficiency Program was adopted for the renovation of multifamily residential buildings

Based on this analysis, the national scheme for energy efficiency obligations was changed through the adoption of amendments to the Energy Efficiency Act of 30 December 2016. According to the changes, Bulgaria introduces alternative measures in addition to the obligations of energy suppliers.

The selected alternative measures are:

1. individual energy saving targets for owners of public buildings and owners of industrial systems - 2014-2016
2. National energy efficiency program for renovation of multifamily housing buildings - current program

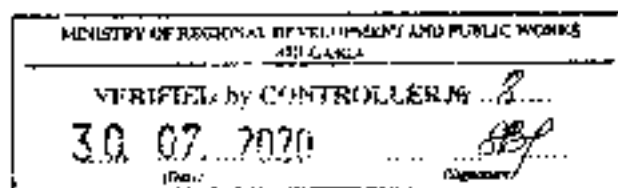


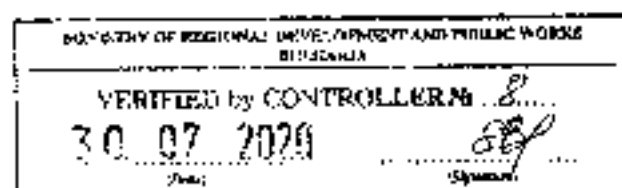
Table 1.3.2: Breakdown of the liabilities scheme 2014-2020 by years, Ttoe / year

Year	Scheme for energy efficiency obligations - a basic approach Ttoe	Alternative measure 1 - Scheme of energy efficiency obligations for buildings and industry Ttoe	Alternative measure 2 National program for renovation of residential buildings Ttoe	Balance for obligated energy suppliers Ttoe
2014	61,7	29		32,6
2015	61,7	20		30,9
2016	75,2	20	7,6	47,6
2017	75,2		23,44	51,76
2018	77,1		16	60,6
2019	77,1		16	60,6
2020	78,3		16	61,8
ALL	506,3			355,86
2014- 2020				
Accumulation 2014-2020	1 942,7			1 283,44

TRENDS IN ENERGY EFFICIENCY

The main consumers of energy in buildings are households.

Figure 8: ODEX energy efficiency index in households for the period 2000-2016, 2000 = 100%.



Source: ODYSSEE-MURE Project

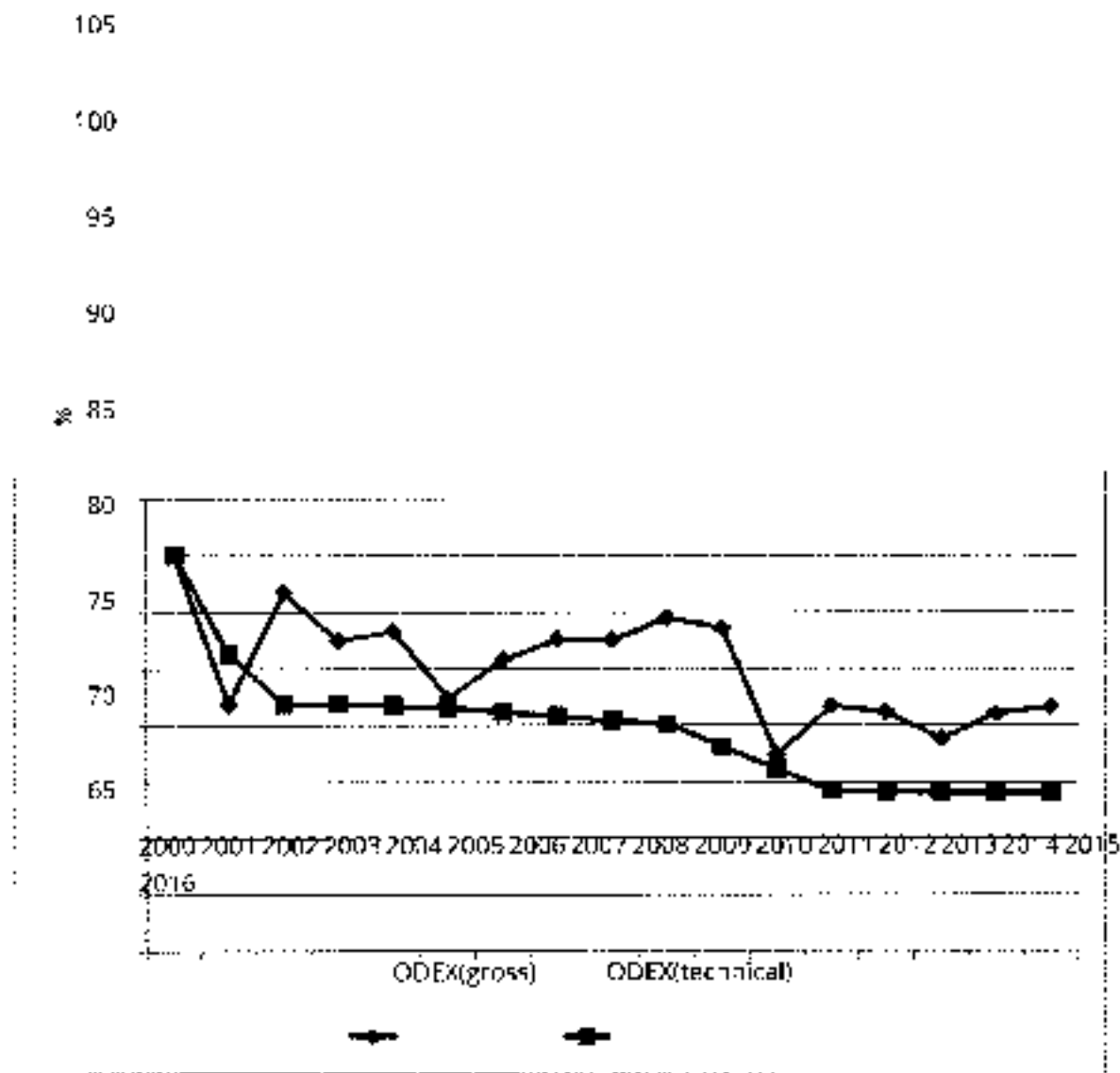


Figure 8 shows the change in the two common ODEX indices in the Households sector

The technical index only takes into account the increase in energy efficiency of buildings and household appliances, while the gross index shows the real change in household efficiency.

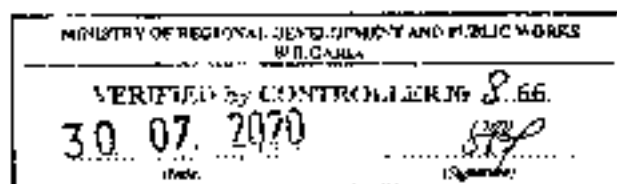
The technical index decreased continuously throughout the period and in 2016 was 79% of the level in 2000, the gross index decreased to a lesser extent (to 86.7%) due to the increase in the level of comfort in households.

Figure 9: Breakdown of changes in energy consumption of households 2000-2015

Source: ODYSSEE-MURE Project



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BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES



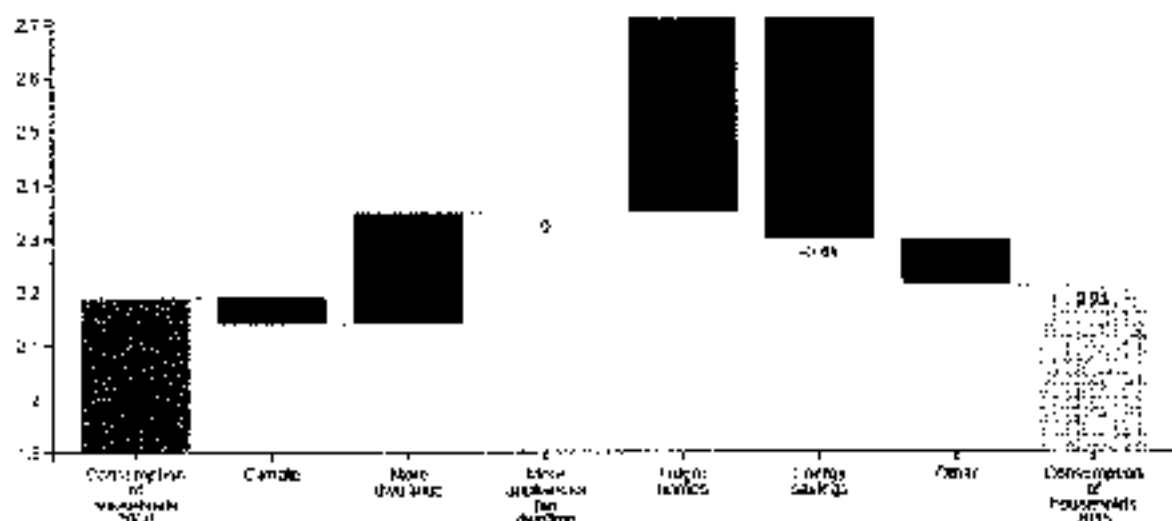
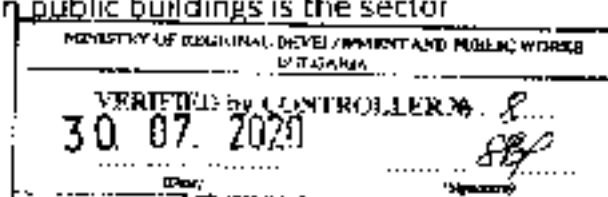


Figure 9 shows an analysis of changes in final energy consumption in the period 2000-2015:

- Final energy consumption is practically constant.
- The Increase in the number of dwellings and their average area have contributed to an increase in energy consumption by 0.57 Mtoe.
- Energy savings due to the technical increase of energy efficiency have reduced consumption by 0.41 Mtoe.

The second sector that covers energy consumption in public buildings is the sector "Services".



During the period under review, the ODEX services index showed significant fluctuations - rapid improvements in the period 2002-2004 and after 2012, but also the period of deterioration in the years 2005-2012.

Some reasons for the deterioration of EE in this sector after 2004 are:

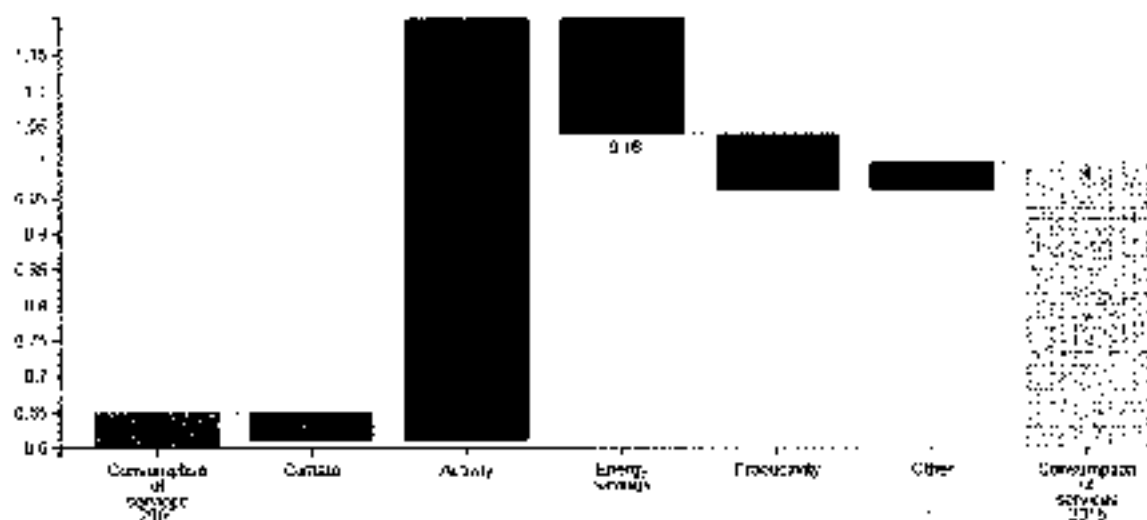
- Increasing energy intensity in the period 2007-2011, when the growth in energy consumption is faster than the increase in GVA of the sector.
- The energy consumption per employee (after climate adjustment) increased in the period 2004-2012, regardless of the effects of EE policies and

measures, aimed primarily at public buildings.

In 2016, the index reached 87% of the level in 2000, ie, there was an improvement of 13% in the period 2000-2016.

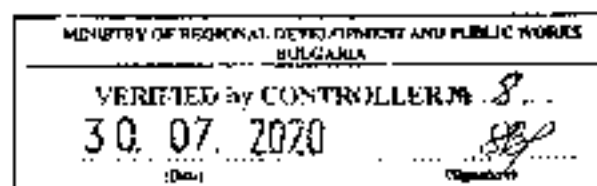
Figure 11: Breakdown of changes in final energy consumption of the Services sector 2000-2015

Source: ODYSSEE-MURE Project



Final energy consumption increased significantly (54%) in the sector for the period 2000 - 2015.

The growth of annual energy consumption is due to:



- Increased economic activity leads to an increase in consumption by 0.59 Mtoe.
- Energy savings reduce energy consumption by 0.16 Mtoe.
- The change in the productivity of the sector reduces consumption by 0.08 Mtoe.
- The climate effect in the period 2000-2015 also contributed 0.04 Mtoe to reduce energy consumption.
- Other effects, including changes in consumer behavior, lead to an increase in consumption of 0.04 Mtoe.



5. Analysis of the Regional and National Legal and Regulatory Framework in Plovdiv Region/South Central Region and Relevant Policy- Making Trends.

5.1 Regulations at Regional and Local Level

5.2 Relevant Policy – Making Trends

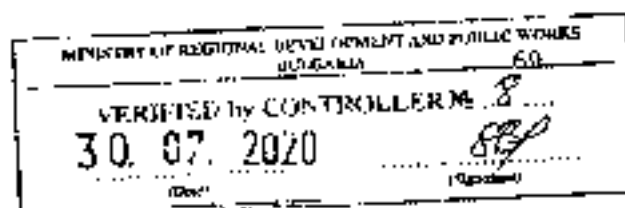
Existing horizontal measures

The current active measures are 11 - mainly legislative, fiscal and financial. Among the measures are ZEE, the Scheme for obligations for energy savings and individual targets for energy savings, FEEVI, preferential prices for electricity from cogeneration and renewable sources, and others. The measure with the most significant horizontal impact is the scheme of commitments with individual targets for energy savings for energy traders. During the first scheme (until 2014), a total of 52 companies that annually supply fuels and energy with an equivalent in excess of 75 GWh received individual targets. For the period from the start of operation of the scheme 2008-2014 inclusive, the achievement of 48.2% of the target was achieved.

For the period 2014-2020, a new scheme with obligations for energy suppliers was put into operation - including alternative measures, in accordance with Article 7 of Directive 2012/27 / EC on energy efficiency. This new liability scheme was drawn up in accordance with Annex V. Part 4 of the Directive.

Following an analysis of the implementation of the national liability scheme, it was amended through changes in the ZEE introduced on 30 December 2016. According to the changes, Bulgaria introduces alternative measures as an additional approach to the obligations of energy traders. The total volume of annual energy savings under the new scheme amounts to 506.3 ha

(5887.3 GWh) by 2020, with the share of energy traders amounting to 70% or 355.9

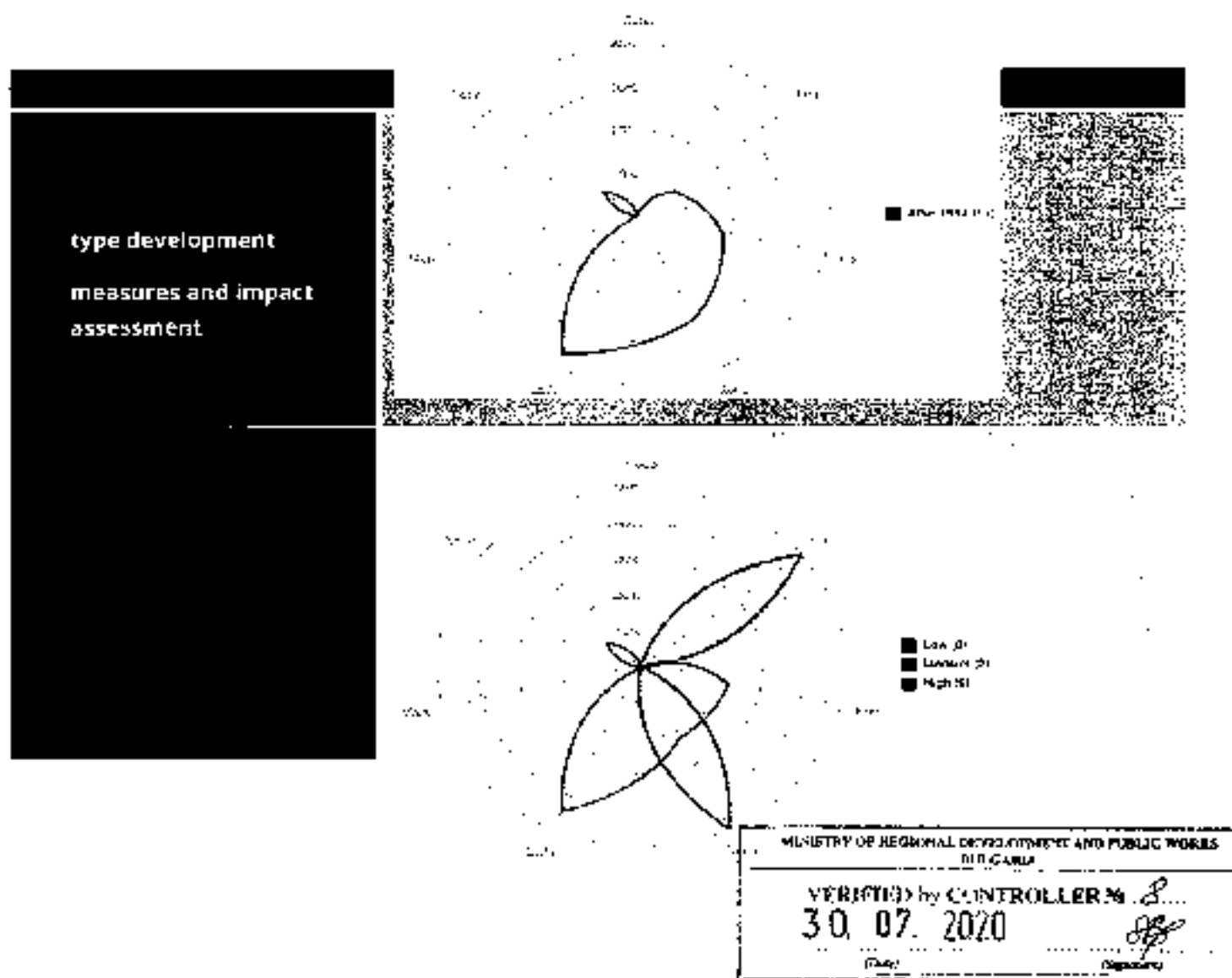


thousand tons (4138 GWh). The calculations under the new liability scheme are shown in Table 1.3.2.

"Breakdown of liabilities by years (2014-2020)" of this national report.

Models and dynamics of horizontal measures

Table 5.2: Development of horizontal measures in the period 1995-2017 by type and impact assessment



Prior to the adoption of the Energy Efficiency Law, the focus of horizontal measures was on national and sectoral energy efficiency improvement programs. After the adoption of the law, the focus shifted to the implementation of regulatory measures. One of the completed horizontal measures in the country with the

greatest impact was the distribution as individual targets among energy traders, part of the national target for energy savings set by Directive 2006/32 / EC. The measure functioned as horizontal due to the fact that in their efforts to achieve individual goals, energy traders could implement energy efficiency measures in all sectors of the economy.

The latest ongoing high-impact horizontal measure is the introduction of a liability scheme for energy traders who need to achieve savings in the period 2014- 2020 according to the requirements of art. 7 of Directive 2012/27 / EC.

Examples of measures with significant quantitative impact

Quantification of some of the more important horizontal measures

Horizontal measures	
Measure	Количествена оценка на годишните
EN 15: Energy Efficiency and Renewable Energy Fund (EEREF)	141.7 GWh (achieved to 2017)
EN 17: Individual targets for energy traders obliged under the ZEE (2008-2016)	2301 GWh (achieved to 2016)
BG 25: Energy saving obligations scheme 2014 - 2020	5889 GWh (goal to 2020)

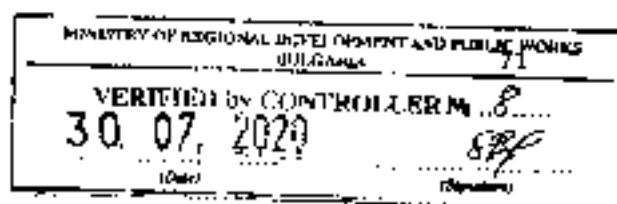
5. Analysis of Relevant Strategies and their Objectives

ANALYSIS OF THE TENDENCIES OF ENERGY CONSUMPTION IN THE REPUBLIC OF BULGARIA

Data from Eurostat and the NSI were used in preparing the analysis. In 2018, the methodology used by the NSI for the preparation of energy balances was changed and is fully consistent with the main recommendations of IRES (International Recommendation on Energy Statistics). In this regard, the data from this analysis are not comparable with the Annual Reports on the implementation of the NEEAP in previous years.



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BUSINESS SUPPORT CENTRE for
SMALL and MEDIUM-SIZED ENTERPRISES



Primary energy consumption, primary energy intensity

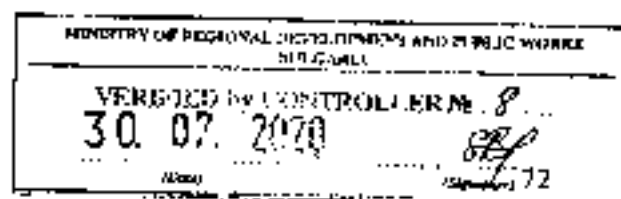


Fig. IV.1: Gross Domestic Product, Primary Energy Consumption and Primary Energy Intensity in the period 2001-2017, indices 2001 = 100%. Source: according to NSI data

In FIG. IV.1-1 shows the indices of change of Gross Domestic Product (GDP), PEP and Primary Energy Intensity (PEI) in the period 2001-2017 and the index in 2001 was adopted as 100%.

The long-term trend in the period 2001-2017 is a total GDP growth of nearly 75%, while primary energy consumption (PEP) decreased by 1.5%.

As a result of the significant GDP growth and the practically unchanged value of PEP, the primary energy intensity (PEI) also significantly decreases. In 2017, it decreased up to 56% of the level in 2001



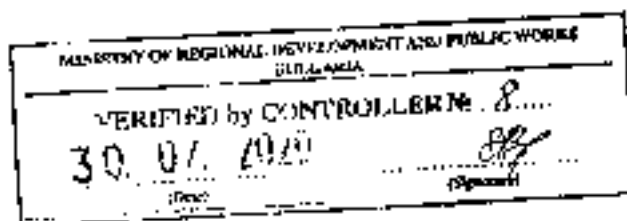
In 2017, GDP increased by 3.8% compared to the previous 2016, but PEP also increased by 3.7%.

PEI in 2017 remains virtually unchanged at 0.211 kgoe / BGN.2010 as it was in the previous 2016. After the significant reduction of energy intensity in 2016, this favorable trend does not continue in 2017.

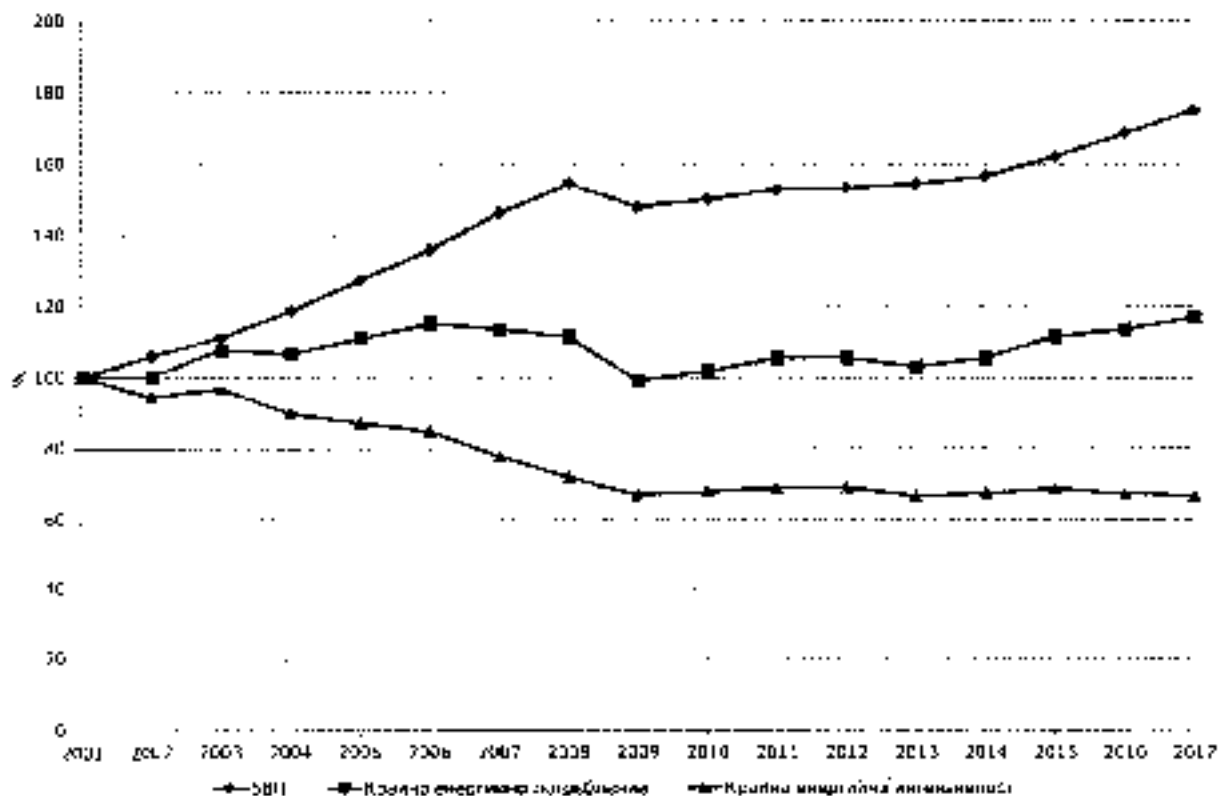
The main factors that determine the change of PEP and PEI are:

- The ratio between PEP and FEC, which shows the efficiency of energy conversion, transmission and distribution from the energy sector to end users.
- FEC, which depends on the energy efficiency of the final users.

As a result of the impact of the above factors, the ratio between FEC and PEP decreased from 53.8% in 2016 to 53.1% in 2017 or an increase of 650 ktoe in PEP. The deteriorated efficiency in the energy sector in 2017 is due to a reduction in the use of energy from renewable sources and increased losses in the conversion, transmission and distribution of energy.



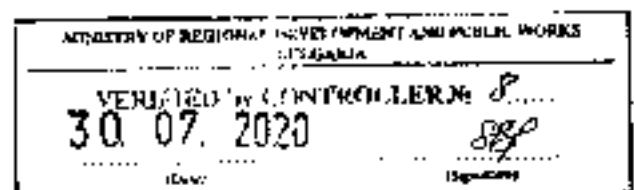
Final energy consumption, final energy intensity



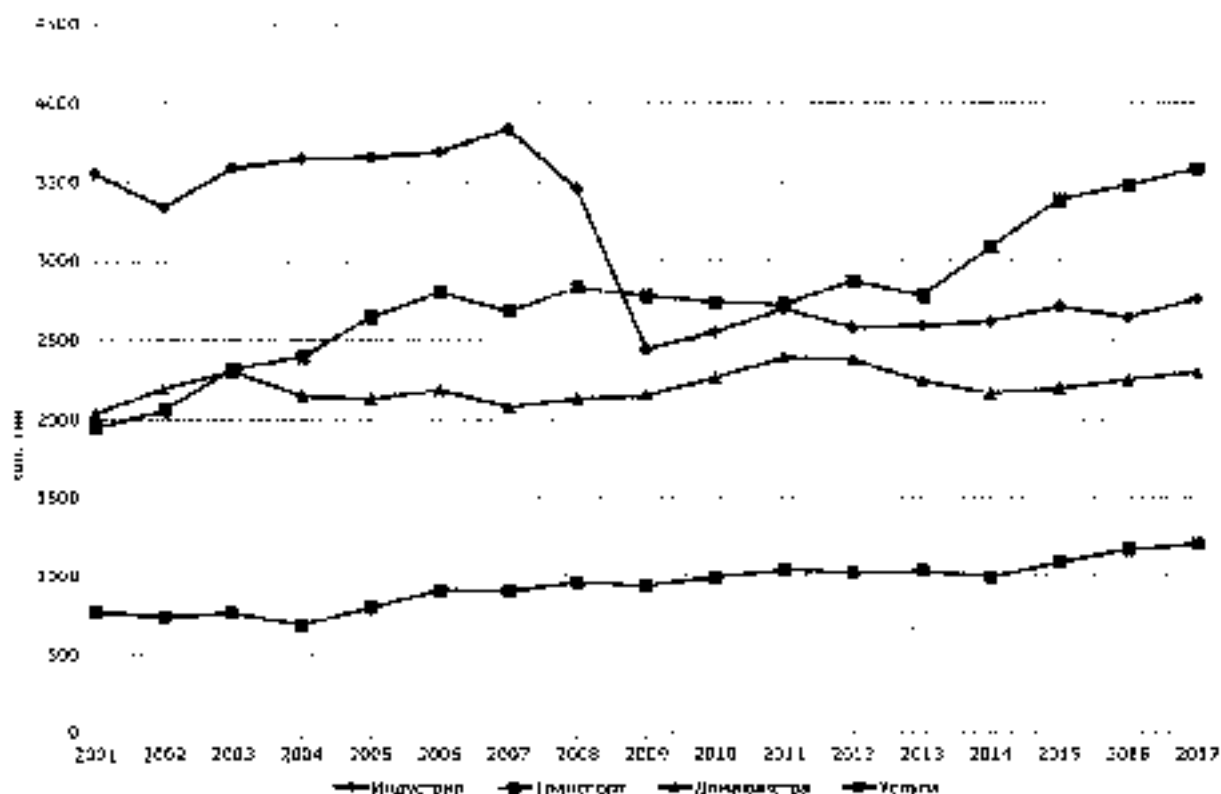
Gross domestic product, final energy consumption and final energy intensity in the period 2001-2017, indices 2001 = 100%. Source: according to NSI data

In 2017, FEC increased by 2.3%, which with a GDP growth of 3.8% leads to a slight decrease in CEI by 1.4% compared to 2016 - from 0.113 kgoe / BGN.2010 to 0.122 kgoe /lv.2010.

From the analysis of the factors influencing the change in KEI the following conclusion can be made - the shares of the Industry and Services sector in the gross value added (GVA) in 2017 remain practically at the level of the previous 2016, which means that during the year there are no structural changes in the economy, due to which the decrease in KEI in 2017 is entirely due to changes in energy intensity within individual economic sectors.



The change of FEC in the main sectors that consume energy in the period 2001-2017 is shown in the following fig.

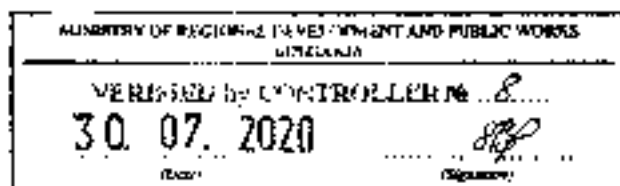


Final energy consumption by sectors 2001-2017 Source: according to NSI data

During the period 2001-2017, energy consumption decreased significantly in the sector

Industry (by 24.2%). The decrease in consumption in the agriculture sector is 37%, but as the sector has the smallest share in FEC it is not shown in the figure. The growth of household consumption is relatively moderate - 17.4%. Significant growth (55%) is in energy consumption in the Services sector.

The largest growth in 2017 compared to 2001 was recorded in the Transport sector - 67.4%, which since 2009 has replaced the Industry sector as the largest energy consumer.

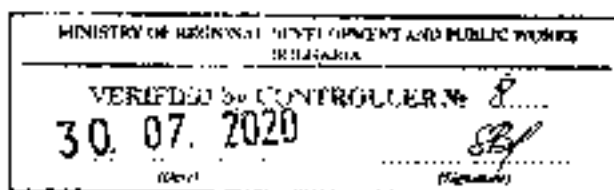


The analysis for the last statistical year – 2017 shows an increase compared to 2016 in energy consumption in the industry sector by 3%, in the transport sector by 1.8%, in the services sector by 2.4% and in the Households sector – by 3%. In the "Agriculture" sector there is a decline in consumption, as in 2017 it was 6.4% compared to 2016.

FINANCING

SOURCES OF FINANCING of projects for improvement of energy efficiency and of projects using energy from renewable sources in Bulgaria

- Physical persons
- Companies
- Municipalities (Public sector)
- Operational Programme – regions in Growth 2014-2020 r.
- Energy Efficiency of Multi-Family Residential Buildings National Programme
- Energy Efficiency and Renewable Sources
- The program for lending to energy efficiency in the home
- Financial mechanism of the European Economic Area 2014-2021
- Rural Development Program 2014-2020



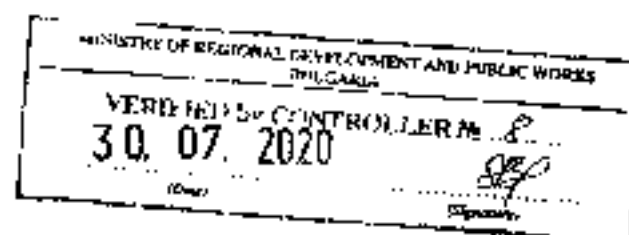
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ANALYSIS of the implementation of municipal and regional energy programs efficiency in 2019 by regions for economic planning in Bulgaria - SEDA 2020

ANALYSIS of the implementation of municipal and regional energy programs efficiency in 2018 by regions for economic planning in Bulgaria - SEDA 2019

ANALYSIS of the implementation of the municipal short-term and long-term programs for promotion of the use of energy renewable sources 2020 - SEDA

Trends and policies for energy efficiency in Bulgaria - SEDA 2018



7. Annex

