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GREEN BUILDING FOR COMMON GREEN FUTURE

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REGIONAL ENERGY STRATEGY OF THE CROSS-BORDER REGION – BLAGOEVGRAD DISTRICT AND CENTER FOR DEVELOPMENT OF THE EAST PLANNING REGION OF THE REPUBLIC OF MACEDONIA FOR THE PERIOD 2018-2023

September 2018

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LIST OF ABBREVIATIONS	
BA	Built-up area
DP	Dust particles
EA	Employment Agency
EBA	Extended built-up area
EE	Energy efficiency
EEA	Energy Efficiency Act
ESM	Energy saving measures
EU	European Union
GDP	Gross domestic product
GVA	Gross value added
HPP	Hydroelectric power plant
MEW	Ministry of Environment and Water
MPEUERSB	Municipal programs to encourage the use of energy from renewable sources and biofuels
NSI	National statistical institute
OPRD	Operational Program "Regional Development" 2007-2013
RE	Renewable energy
RES	Renewable energy sources
RES	Regional Energy Strategy
RIEW	Regional Inspectorate of Environment and Water
RS	Renewable sources
SEDA	Sustainable Energy Development Agency
SHPP	Small hydroelectric power plant
SIS	State Institute of Statistics
SME	Small and medium enterprises
TFA	Tangible fixed assets

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I. INTRODUCTION

Energy is the main source of life force of our society and a determining factor for the future development of social and economic life. Dynamic climate change requires an overall change in people's thinking regarding rational use of resources and limiting the harmful impact of human intervention on the environment. Its preservation is crucial to the lives of future generations.

Energy security is a key priority of the European Union (EU) and a key element in the programming period 2014-2020.

In this regard, the development of a strategy to inform authorized regional and local decision-makers in the cross-border area on the state and prospects for the development of energy efficiency and renewable energy policies, corresponds with European policy and supports the efforts of Member States to struggle against the negative effects of climate change.

The Regional Energy Strategy (RES) can be used as a common strategic framework for the cross-border area. The document is a key instrument for implementing all energy efficiency measures and renewable energy production in the region, which will contribute to reducing carbon dioxide and other greenhouse gas emissions in the atmosphere and it will limit the negative impacts of climate change. RES is a medium-term strategic document that will support the efforts of the local authorities in Blagoevgrad district of Bulgaria and the Eastern region of Macedonia to reduce energy consumption in public buildings and improve the coordination and methodology of activities in the field of energy efficiency and renewable energy.

1. Reason for development

This document was prepared in connection with the implementation of **Action 9 - Regional Energy Strategy** under Project No CB006.1.11.038-PP2-S3 entitled "Green Buildings for a Green Future - GREEN", which is funded under the Cross-Border Cooperation Program between the Republic Bulgaria and the Republic of Macedonia.

The project partners are Blagoevgrad region and the Center for Development of the East planning region of the Republic of Macedonia - with the center of Stip municipality, Shtip.

The main objective of the strategy is to achieve sustainable use of the energy resources of the cross-border region and to reduce its greenhouse gas emissions by implementing energy efficiency activities to improve the management of public buildings and providing methodological support to municipalities in the cross-border region.

Within the framework of the Strategy activities and measures are identified, based on an analysis of the current state of energy consumption in the cross-border region. They include limiting the harmful impact of harmful substances in the environment by applying energy-efficient activities in public buildings. The expected results from their implementation will

contribute to the achievement of the identified energy objectives, both at EU and national level, in the field of energy, as follows:

- **European objectives by 2020**
  - To reduce greenhouse gas emissions by at least 20% compared to 1990 levels;
  - To increase up to 20% of the share of renewable energy in total EU energy consumption by 2020;
  - To increase energy efficiency by 20%.
- **European objectives by 2030**
  - To reduce greenhouse gas emissions with 40%
  - At least 27% of the energy to be from renewable sources;
  - To increase energy efficiency by 27-30%.
- **National objectives by 2020 – Republic of Bulgaria**
  - 16% of the total final energy consumption in the country in 2020 should be from renewable sources.
- **National objectives by 2020 – Republic of Macedonia**
  - To improve energy efficiency by 35% by 2020 compared to year 2006;
  - To increase the share of energy from renewable sources to 21% of the final energy consumption by 2020;
  - To reduce final energy consumption by 9% by 2020.

The Regional Energy Strategy includes the territory of Blagoevgrad region and the Center for Development of the East planning region in the Republic of Macedonia, with its center - the municipality of Shtip. The strategy reflects the vision for the development of the energy sector in the cross-border region in accordance with the European and national policies of the Republic of Bulgaria and the Republic of Macedonia in the field of energy sector and global trends.

2. European and National Legislation (Republic of Bulgaria and Macedonia) in the field of energy efficiency and renewable energy sources

The policies of the EU, the Republic of Bulgaria and the Republic of Macedonia are aimed at limiting greenhouse gas emissions from the use of energy resources, restructuring to a low-carbon economy by implementing energy efficiency measures and stimulating the use of renewable energy sources in local short-, medium- and long-term strategies / plans / programs, as well as improving people's lives with minimal negative impact on the environment.

This strategy complies with the defined energy objectives and priorities in the current strategies of EU, the Republic of Bulgaria and the Republic of Macedonia and it complies with the energy regulations at European and national level as indicated in the following two sub-points:

2.1 Energy efficiency policy

Energy efficiency has a big significance for all citizens, considering the tangible impact of increased energy bills for citizens and businesses. In this regard, reducing energy consumption is a suitable long-term solution and a cost-effective way of overcoming energy challenges in terms of achieving sustainable development and it is an appropriate instrument for improving the quality of energy services at an affordable cost to society.

The European, Bulgarian and Macedonian objectives and priorities in the field of energy efficiency are set out in the following regulatory documents:

- **Regulatory documents at European level:**
  - Energy 2020. A strategy for competitive, sustainable and secure energy;
  - Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020;
  - Directive 2010/31 / EU of the European Parliament of 19 May 2010 on the energy performance of buildings;
  - Energy Efficiency Action Plan (2007-12).
- **Regulatory documents at national level - Republic of Bulgaria**
  - Energy Act (2018);
  - Energy Efficiency Act (2015).
- Sub-statutory regulations:
  - Ordinance No. 7 of 2004 on Energy Efficiency of Buildings;
  - Ordinance No. 5 of 2006 on the technical passports of the constructions;
  - Ordinance No. 2 of 2008 for design, implementation, control and acceptance of waterproofing and waterproofing systems of buildings and facilities;
  - Ordinance No 2 E-RD-04-1 of 22 January 2016 on Energy Efficiency Audits, Certification and Assessment of Energy Savings of Buildings;
  - Ordinance No 2 E-RD-04-2 of January 22, 2016 on energy consumption indicators and energy performance of buildings;

- Ordinance No. RD-16-932 of 2009 on the conditions and procedure for performing an energy efficiency check of hot water boilers and of air-conditioning installations under Art. 27, para. 1 and Art. 28, para. 1 of the Energy Efficiency Act and for the creation, maintenance and use of their database.

▪ Strategies, plans, programs

- Energy Strategy of the Republic of Bulgaria by 2020;
- National Development Program: Bulgaria 2020;
- National Energy Efficiency Action Plan 2014-2020;
- National plan for improvement of the energy performance of heated and / or cooled buildings - state property, used by the state administration for the period 2016 - 2020;
- National Program for Energy Efficiency of Multifamily Residential Buildings;
- National long-term investment promotion program for implementation of measures to improve the energy performance of public and private residential and commercial buildings for the period 2016-2020.

- **Regulatory documents at national level - Republic of Macedonia**
  - Energy Act (2016);

2.2 Policy in the field of renewable energy sources

The increasing consumption of energy by the society and businesses necessitates a change of policy and strategies in the field of energy. Traditional methods of producing energy, based on underground fuels, have a negative impact on the environment and pose significant risks to future generations. Climate change is a fact and affects all people. More often there are negative weather phenomena that cause human and material losses - floods, droughts, tornadoes, etc.

A long-term and effective solution to the above challenges is the use of renewable energy sources - wind, solar energy, hydropower, ocean energy, geothermal, biomass and biofuels. They are an alternative to fossil fuels, contribute to reducing greenhouse gas emissions, reduce energy dependence on oil, natural gas, etc. and stimulate the creation of new jobs.

In response to the dynamic changes in the energy sector in recent years, the regulatory framework for the stimulation of the use of renewable energy sources has been changed and ambitious goals have been set for the development of the same.

The renewable energy sources policy is regulated in the following normative documents:

- Regulatory documents at European level:
  - Energy 2020. A strategy for competitive, sustainable and secure energy;

- Directive 2001/77 of the European Parliament and of the Council of 27th of September 2001 on the promotion of the production and consumption of energy from renewable energy sources in the internal market;
- Decision No 406/2009/EC of the European Parliament and of the Council of 23rd of April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020;
- Directive 2009/28 / EC of the European Parliament and of the Council of 23rdof April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77 / EC and 2003/30 / EC;
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Energy 2020 A strategy for competitive, sustainable and secure energy;
- Directive 2010/31 / EC of the European Parliament and of the Council on the energy performance of buildings.

- Strategies, plans, programs
  - Energy Strategy of the Republic of Bulgaria by 2020;
  - National Development Program: Bulgaria 2020;
  - National Renewable Energy Action Plan 2010 - 2020;
  - National long-term program to promote the use of biomass for the period 2008-2020.
- Regulatory documents at national level - Republic of Bulgaria.
  - Energy Act (2018);
  - Renewable and Alternative Energy Sources and Biofuels Act (2015).
- Sub-statutory regulations - Republic of Bulgaria
  - Ordinance № 16 - 27 of 22.01.2008 on the conditions and procedure for assessment of the available and forecast potential of the resource for production of energy from renewable energy sources and alternative energy sources;
  - Ordinance № 16-28 on the content, the conditions, the order and the way of providing information about the produced, purchased and sold quantities of energy from renewable and alternative energy sources and the produced, purchased and sold quantities of biofuels;
  - Ordinance on issuing certificates of origin for electricity produced from renewable energy sources.
- Regulatory documents at national level - Republic of Macedonia
  - Energy Act (2016);
- Strategies, plans, programs

- Strategy for the development of the energy of the Republic of Macedonia by 2030;
- Strategy for increasing the energy efficiency of the Republic of Macedonia by 2020;
- Strategy for the use of renewable energy sources of the Republic of Macedonia by 2020;
- Third Energy Efficiency Action Plan of the Republic of Macedonia for the period 2016 – 2018.

- Sub-statutory regulations - Republic of Macedonia
  - Rules on the energy performance of buildings;
  - Rules for the production of energy from renewable sources;
  - Regulations for preferential producers of electricity from renewable energy sources.

3. Other documents in the energy sector (plans, programs, initiatives, etc.)

In the process of development of the Regional Energy Strategy have been identified the following actual documents in the field of the energy sector in the territory of the cross-border region:

Republic of Bulgaria – Blagoevgrad district

Documents in the field of energy sector in connection with the application of Art. 7, para 1 of the Renewable and Alternative Energy Sources and Biofuels Act and Art. 12, para. 1 and 2 of the Energy Efficiency Act of the Republic of Bulgaria

- Strategies
  - Regional Strategy for regional development of Blagoevgrad district 2014-2020.
- Plans
  - Sustainable energy action plan for the municipality of Petrich for the period 2013-2020;
  - Short-term plan for energy efficiency of the municipality of Strumyani for the period 2018 - 2021 and program for its implementation;
  - Energy efficiency plan and program for its implementation in the municipality of Sandanski 2016 – 2020.
- Programs
  - Municipal energy efficiency program of the municipality of Bansko for the period 2012-2020;
  - Energy efficiency program of the municipality of Belitsa for the period 2017 - 2027;
  - Municipal program for promotion of the use of energy from renewable sources and biofuels of the municipality of Belitsa for the Period 2018 - 2028;

- Municipal short-term program for promoting the use of renewable energy and biofuels in the municipality of Garmen for the period 2016 - 2018;
- Municipal program for promotion of the use of energy from renewable sources and biofuels in the municipality of Gotse Delchev;
- Municipal short-term program to promote the use of renewable energy and biofuels in the municipality of Kresna for the period 2016-2019;
- Municipal program for increasing energy efficiency and renewable energy sources of the municipality of Razlog by 2020;
- Municipal program for promotion of the use of renewable energy and biofuels in Razlog municipality for the Period 2015 - 2020;
- Short-term program to stimulate the use of renewable energy and biofuels in accordance with the National Renewable Energy Action Plan in the municipality of Strumyani for the period 2018 - 2021;
- Energy efficiency program of the municipality of Satovcha for the period 2013 – 2016;
- Short-term program to promote the use of renewable energy and biofuels in the municipality of Satovcha 2016-2018;
- Energy efficiency program of the Yakoruda municipality for the period 2016-2025;
- Municipal program of the municipality of Yakoruda for the promotion of the use of energy from renewable sources and biofuels for the period 2015 – 2020.

- Local initiatives / projects (in progress, future)

The Republic of Macedonia - East planning region in Macedonia

- Plans
  - Action Plan for energy from renewable energy sources of the Republic of Macedonia (project);
  - Third energy efficiency action plan of the Republic of Macedonia for the period 2016 – 2018.
- Programs
  - National program for energy efficiency in public buildings of the Republic of Macedonia for the period 2012-2018;
  - Municipal energy efficiency program of Shtip municipality for 2011-2016;
  - Municipal energy efficiency program of the Pehchevo municipality for the period 2014 - 2016;
  - Municipal energy efficiency program of the municipality of Kochani for the period 2011 - 2013;
  - Municipal energy efficiency program of the municipality of Delchevo for the period 2011 – 2015

- Municipal energy efficiency program of the municipality of Probisyp for the period 2011 - 2015;
- Municipal energy efficiency program of the municipality of Berovo for the period 2014 – 2016.

4. Regulatory constraints for the realization of the Regional Energy Strategy

This document complies with the current legislation on energy efficiency, renewable energy sources and biofuels of the Republic of Bulgaria and the Republic of Macedonia and takes into account the measures and actions taken at national and regional level.

According to the legislation of the Republic of Bulgaria, local authorities are responsible for the implementation of the energy efficiency policy through the preparation of energy efficiency plans and programs for their implementation for a specific programming period in accordance with the strategic objectives and priorities of the regional development plans for the region.

In accordance with Art. 6, para. 1 and 2 of the Renewable and alternative energy sources act, the regional governors ensure the implementation of the state policy in this field.

The abovementioned law entitles the obligation of municipal mayors to develop municipal long-term and short-term programs to stimulate the use of renewable energy sources, alternative energy sources and the consumption of biofuels and other renewable fuels in transport and to control their implementation.

Similar to the Bulgarian legislation, the Energy Act of the Republic of Macedonia obliges local municipalities to prepare energy efficiency programs for three years period, annual reports and to provide information to the State Energy Agency.

Almost all municipalities in Blagoevgrad district have prepared energy efficiency plans and / or progrmes/plans for renewable energy sources, while in the East planning region of Macedonia their number is significantly lower.

The review of the available regulatory framework, strategic, planning and programming documents showed that there are currently available programs / plans for energy efficiency and renewable energy sources of the municipalities in the cross-border region, but there is no effective energy strategy at regional level for both Blagoevgrad district and for the East planning region of Macedonia, which is why the role and importance of the Regional Energy Strategy as an instrument for implementing energy policies for the cross-border region is growing.

In connection with the above, the regional authorities - Blagoevgrad district administration and the authorities of the East planning region of Macedonia, should define a vision for development, strategic objectives, activities and measures of the Regional Energy Strategy on the basis of the prepared strategic documents - regional, municipal plans, programs for energy

efficiency and renewable energy sources and others to contribute to meeting European and national energy goals.

It should be noted that the currently existing documents in the cross-border region, including specific objectives and activities in the field of energy efficiency and renewable energy, are the above-mentioned laws, plans and programs.

Despite the established regulatory framework, one of the main obstacles and barriers to implementing EE measures and promoting the use of renewable energy sources is the level of decentralization of the local authorities, which is relatively low. The municipalities have significant political rights but they have limited financial autonomy and powers to make investment decisions without the support of the central government.

Few business entities (companies) have sufficient potential to participate fully in solving important public-state tasks. The region's countries economy still does not operate under the typical market conditions, which affects negatively the investment and efficiency-enhancing activities.

The baseline of the facilities where energy efficiency improvement activities are implemented is often significantly below the regulatory requirements - unheated rooms, under-lighted streets, and so on. The initial savings from the efficiency gains are usually spent to achieve the normatively required quality of the services - reaching (or coming closer) the established heating or lighting standards. This in practice reduces the real cash proceeds from the realization of the projects, which is an obstacle to proving the possibilities for their bank financing. It can be expected that under the current economic conditions the achievement of the normative levels of heating and lighting and the recovery of the economies will develop more rapidly than the reduction in energy consumption as a result of the implemented energy efficiency projects. Under these circumstances, significant reductions in greenhouse gas emissions by the specified percentage may be an overwhelming task for the countries of the region if no targeted measures are taken to support them.

At present, the income of the population in Bulgaria is significantly lower than the EU average, and most of the municipalities and companies have limited financial resources. There are some prerequisites for revitalization in some sectors of the economy, but continued recession and impoverishment are a serious obstacle to the rapid recovery of the region. At the same time, the low starting state of energy consumption, forcedly limited by the low incomes, is accompanied by the still continuing subsidy for certain energy prices. All these circumstances make a significant part of the potential energy efficiency measures economically and socially inefficient or unbearable due to the significant volume of the initial investment. This greatly restricts the number of applicable measures and, hence, the choice of means to influence the sites. There are currently several main groups of obstacles to the actual actions for the increase of energy efficiency in Bulgarian municipalities. Their clear definition is a prerequisite for the right choice and the exact addressing of the efforts to overcome them.

The technical and institutional constraints to EE in public buildings in the Republic of Macedonia are: the institutional capacity of the state institutions responsible for EE at national level is not satisfactory. The necessary strengthening of these institutions is delayed due to the following reasons: budget deficit and the existence of other priorities, the need to improve energy management in public buildings, lack of specific internal expertise in energy management; lack of information on the use and cost of energy in the buildings; lack of measurement and control over energy consumption; lack of skills and experience, insufficient equipment and personnel in the ministries and other state institutions for management of the activities provided by the Energy Act of the Republic of Macedonia. The situation in the municipalities is similar, although some implemented projects have contributed to improving the capacity of the municipal administration. So far, no measures have been undertaken to meet the requirements of the law, there is insufficient experience and attempt to exercise control in the energy sector. It is planned that important legal regulations will be adopted and enacted to regulate the energy control and balance the underdeveloped market for energy efficiency services and products. There is no market for ESCO, although energy efficiency projects will be paid out over time. Among the main obstacles to EE in the public sector is the chronic shortage of funding. An example of such restrictions in the Republic of Macedonia are the costs associated with energy efficiency projects in public buildings, the satisfaction of economic, social and infrastructure needs. The relevant ministries and municipalities in the Republic of Macedonia face these challenges in the context of insufficient budget resources. According to the national legislation in the Republic of Macedonia, the public organizations are not allowed to apply for loans on their behalf, but only through the Ministry of Finance. The Municipal Financing Act limits the total amount of short-term loans by the municipality (up to one year) to a maximum of 30% of the total revenue for the previous year. Also, annual repayments of long-term loans (with a maturity of more than one year) can not represent more than 30% of the total revenue for the previous year, which in practice creates an objective impossibility to show and offset energy efficiency savings because accounting systems do not allow this saving to be clearly distinguished from other payment positions. According to the current normative acts, the municipalities can lend loans only as general obligations, which will be paid out of the total revenues of the municipality. The issue with the low level of municipal loans is crucial in terms of their own implementation in order to obtain loans under normal commercial conditions. There is insufficient understanding and knowledge of the credit mechanisms and procedures for their implementation, the quality of the technical assistance for identification and preparation of EE and renewable energy sources projects for investment, lack of financial incentives and specific financial sources for the realization of projects in the energy efficiency field, which can serve to encourage investment activity in this direction.

In conclusion, the above written challenges are the main obstacles for the realization of projects in the field of EE and renewable energy sources in the Republic of Bulgaria and the Republic of Macedonia.

II. ANALYSIS OF THE CURRENT SITUATION IN THE CROSS-BORDER REGION

1. Analysis of the current situation in Blagoevgrad district

1.1 Statistical data

1.1.1 Geographic location

Blagoevgrad District is located in the Southwestern part of the territory of the Republic of Bulgaria, between the districts of Kyustendil, Sofia, Pazardjik and Smolyan. It is a border area to the south with Greece and to the west it borders with the Republic of Macedonia. The total area of the region includes the valleys of Struma and Mesta rivers, Pirin mountains, as well as the parts of Rila, the Rhodope, Slavyanka, Belasitsa, Ograzhden, Maleshevska and Vlahina mountains.

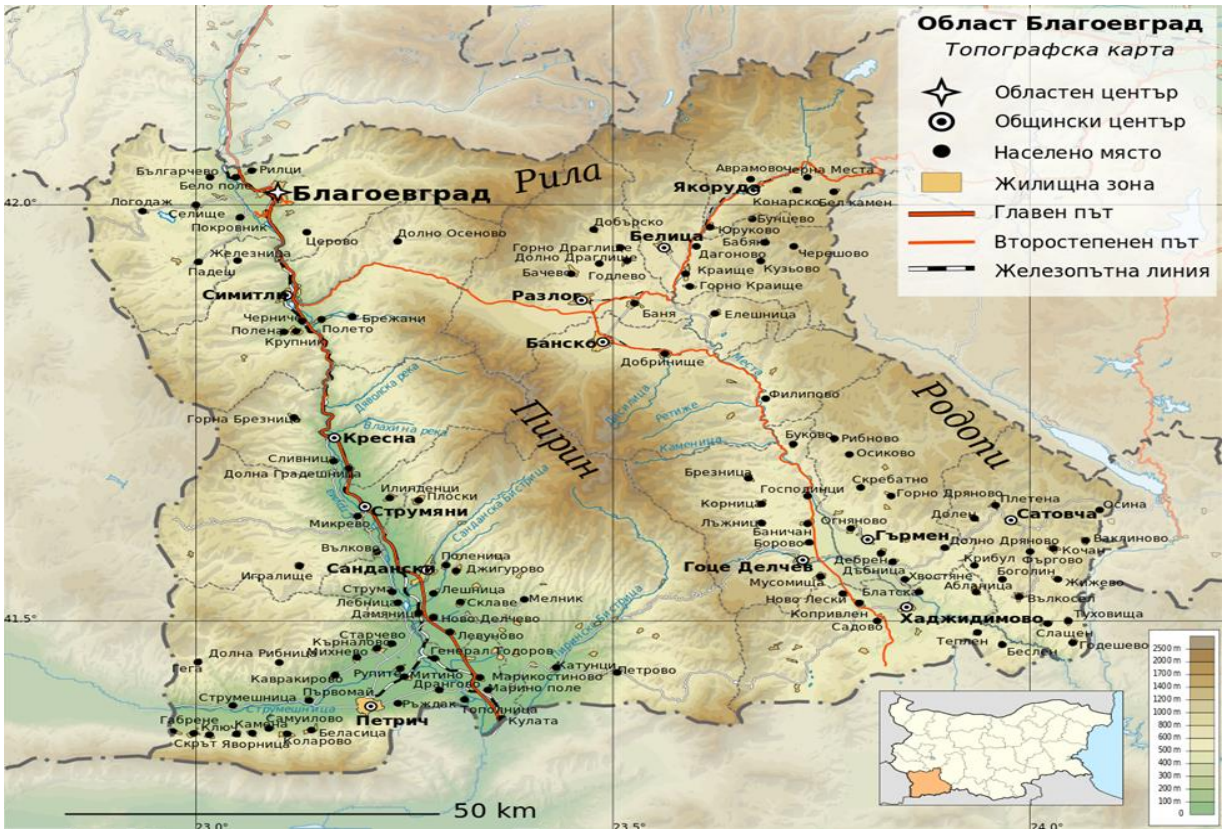
Fig. 1

1.1.2. General characteristics of the territory

The territory of the district includes 14 municipalities, 96 city-halls and 280 settlements.

The administrative center of the district is Blagoevgrad.

Fig. 2



1.1.3. Relief

The territory of Blagoevgrad region characterizes by a variety of terrain due to the inclusion, in whole or in part, of territories from Rila, Pirin, Rhodope, Vlahina, Maleshev, Ograzhden, Belasitsa and Slavian mountains. The natural environment is well preserved and extremely diverse throughout the region.

Protected areas

The conservation of the diversity of animal species and plants and their natural environment is a high priority in the national environmental policy, which is carried out through the designation of protected areas.

Within the regional territory a large number of protected areas are included as follows:

- National park “Pirin” and part of National park “Rila”;
- Nature reserves – Bayuvi Dupki - Djindjiritsa, Tisova Bourchina and Segmen Tepe in Pirin, Parangalitsa in the Southwest Rila, Belasitsa, Alibotush in Slavyanka, Temnata gora and Konski Dol in the Western Rhodopes;

- 69 natural landmarks and four protected areas, covering a total of 767 826 decares or 11.9% of the territory of the region - much more than the average for the country (3.6%).

The protected areas have a rich flora and fauna. They contain rare tree and grass species. Some 1,400 species of higher plants are observed, of which 51 species are protected plants, 101 species of plants are included in the Red Data Book of the Republic of Bulgaria and the medicinal plants are 58 species.

The designation of protected areas, territories and landmarks is in order to preserve the landscape components, the habitats of endangered, rare and vulnerable animal and plant species, and in particular the protection from malicious human activities.

1.1.4. Climate

There are three climatic areas typical of the region: transitional continental, transitional Mediterranean and a mountainous area. Mediterranean influence is most perceptible in the regions of the Struma, Strumenshnica and Mesta rivers and creates favorable conditions for the growth of Mediterranean type species due to the possibility of irrigation.

Despite the good prerequisites for agricultural crop development, there are also unfavorable circumstances such as a limited number of rainfalls and prolonged droughts, especially during the summer.

1.1.5. Water resources

The rivers Struma and Mesta and their tributaries - Blagoevgradska Bistritsa, Pirinska Bistritsa, Lebnitsa, Strumeshnitsa, Belishka river, Demyanitza, Kanina, Bistritsa, Tufcha etc., as well as over 160 circular lakes in Pirin, karst springs in Pirin and Slavyanka are the main water resources in the area.

The hot and cold water springs with a high flow, which occupy a significant share of the entire territory of the Republic of Bulgaria - about 40%, are a real fortune for the region. The existence of thermal springs favors the development of balneotherapy and prophylactic, as well as greenhouse production.

1.1.6. Water infrastructure

On the territory of Blagoevgrad district are built 200 km. primary and secondary canals, 220 ponds and 28 reservoirs - Tsaparevo, Harsovo, Slathen, Yakovo, Scrat, Selishte, Satovcha, Sadovo, Ribnovo, Ploshki, , "Oshtava", "Muletarovo", "Marikostosovo", "Ljubovishte", "Listenitsa", "Leshko", "Kochan I", "Kornitsa", "Klyuchi", "Kalimanci", Kavrakirovo, "Golem Palim", "Valkosel", "Vlahi III", "Belyovo", "Belitsa".

According to the data for Blagoevgrad district from the document “Regional Profiles, although the share of the population living in settlements with public sewerage is high (77%),

the connection of the households to the treatment plants is still low. In 2013, sewage treatment plants serve 26.5% of the sewerage system, while this percentage is 56.4 for the country. In the summer of 2015 in Blagoevgrad the modernization of the urban wastewater treatment plant near Strumsko district was completed.

In 2014, the construction of 9 modular water treatment plants in the villages of Kribul, Dolen, Osina, Vaklinovo, Furgovo, Jizhevo, Bogolin, Tuhovishta and Godeshevo started under the project of the municipality of Satovcha approved under the Rural Development Program.

1.1.7. Minerals

The territory of the region is rich in minerals, such as granites and marbles in Pirin, Slavyanka and the Rhodopes, gneiss, mica shale and sedimentary rocks in Vlahina and Maleshevska mountain.

A big part of the Razlog, Gotse Delchev and the Brezhany valley are filled with paleogeneous and neogenic deposits. In the valley of the Struma River and its tributaries there are alluvial deposits.

Antimony ores were found in the village of Ribnovo, molybdenum - in the village of Babak, iron ores in the village of Dolen, coal in the village of Oranovo - the Simitlian coal basin, at the village of Brezhani, near the village of Suhostrel, in the valley of the Kanina / flow of the Mesta River and the town of Razlog. Kizelgur is located near the village of Garmen, fluorite near the village of Palat, asbestos in the village of Kolarovo, marble near Ilindentsi village and Petrovo village.

1.1.8. Soils

Given the peculiar features of the terrain, cinnamon forest soils are widespread, but a large part of them are highly eroded. They are mainly found in the foothills and low mountainous areas.

There are also brown forest soils in the forest massifs, alluvial and delluvial soils near the rivers. In the higher parts of the mountain massifs there are mountain-meadow soils with rich pastures.

1.1.9. Demographic characteristics

The territory of Blagoevgrad district includes 14 municipalities, 96 city-halls and 280 settlements.

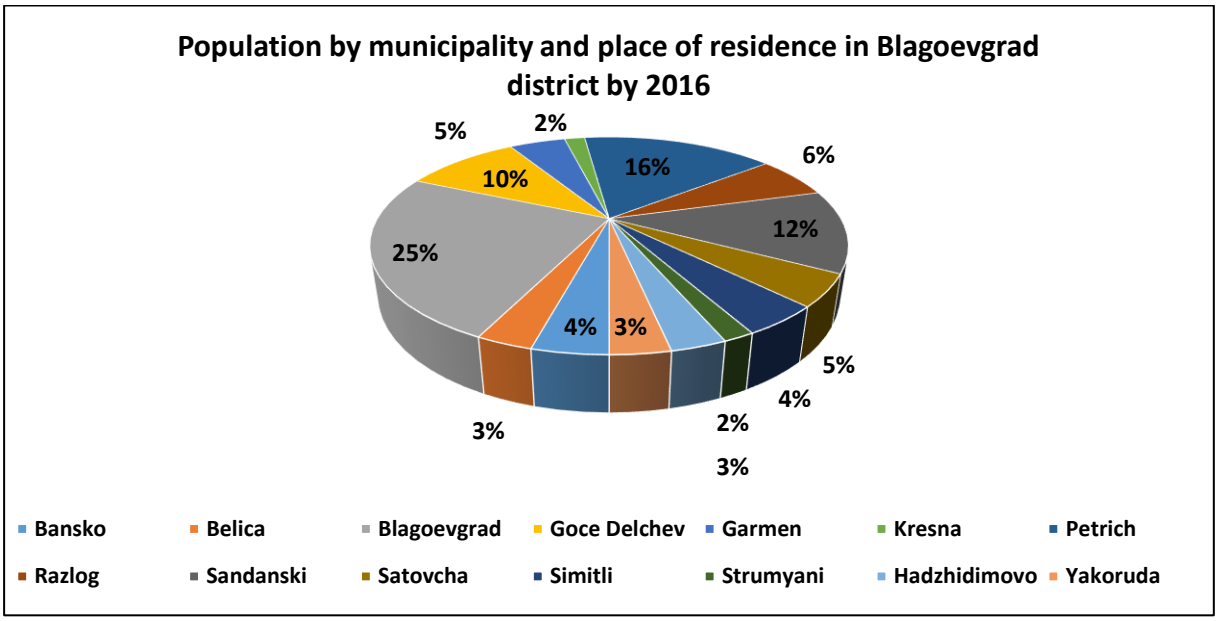
According to the data from the National statistical institute, the population of the region in 2016 is 310 321 people or 4.37% of the population of the Republic of Bulgaria, distributed by municipalities, as follows:

Table 1.

District	Total			In towns			In villages		
Municipalities	**all**	**men**	**women**	**all**	**men**	**women**	**all**	**men**	**women**
Blagoevgrad district	310 321	151 342	158 979	185 060	88 699	96 361	125 261	62 643	62 618
Bansko	12 774	6 220	6 554	11 569	5 649	5 920	1 205	571	634
Belica	9 541	4 675	4 866	3 107	1 492	1 615	6 434	3 183	3 251
Blagoevgrad	75 862	36 141	39 721	69 567	32 951	36 616	6 295	3 190	3 105
Gotse Delchev	30 197	14 691	15 506	18 552	8 839	9 713	11 645	5 852	5 793
Garmen	14 847	7 362	7 485				14 847	7 362	7 485
Kresna	5 389	2 747	2 642	3 425	1 731	1 694	1 964	1 016	948
Petrich	50 890	24 959	25 931	27 587	13 212	14 375	23 303	11 747	11 556
Razlog	19 697	9 592	10 105	11 590	5 588	6 002	8 107	4 004	4 103
Sandanski	38 153	18 528	19 625	25 253	12 132	13 121	12 900	6 396	6 504
Satovcha	14 498	7 288	7 210				14 498	7 288	7 210
Simitli	13 642	6 815	6 827	6 486	3 239	3 247	7 156	3 576	3 580
Strumiani	5 316	2 612	2 704				5 316	2 612	2 704
Hadjidimovo	9 405	4 760	4 645	2 539	1 291	1 248	6 866	3 469	3 397
Yakoruda	10 110	4 952	5 158	5 385	2 575	2 810	4 725	2 377	2 348

According to the data, the municipality of Blagoevgrad has the highest concentration of population in the whole region with a share of 25%, followed by Simitli municipality with 16% and Sandanski municipality - 12%. The remaining municipalities account for between 4-5% of the number of people in the area.

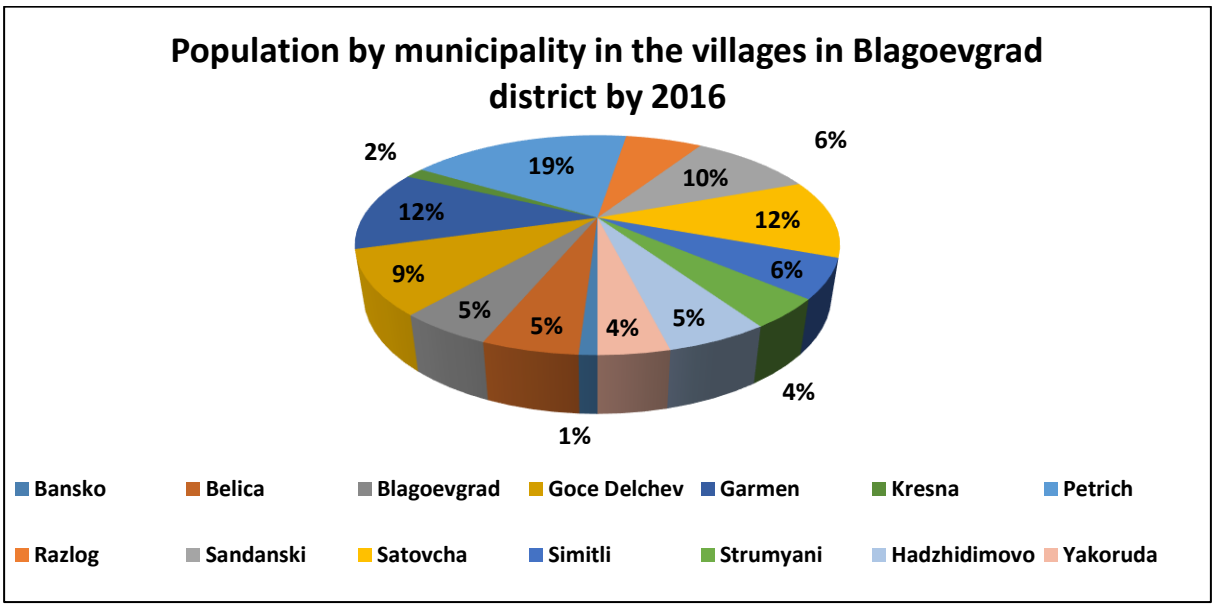
Chart 1.



Source: NSI

The rural population has the largest share in the municipalities of Petrich (18.60%), Garmen (11.85%), Satovcha (11.57%), Sandanski (10.30%) and Gotse Delchev (9.30%). Most of the settlements in the above-mentioned municipalities are predominantly villages.

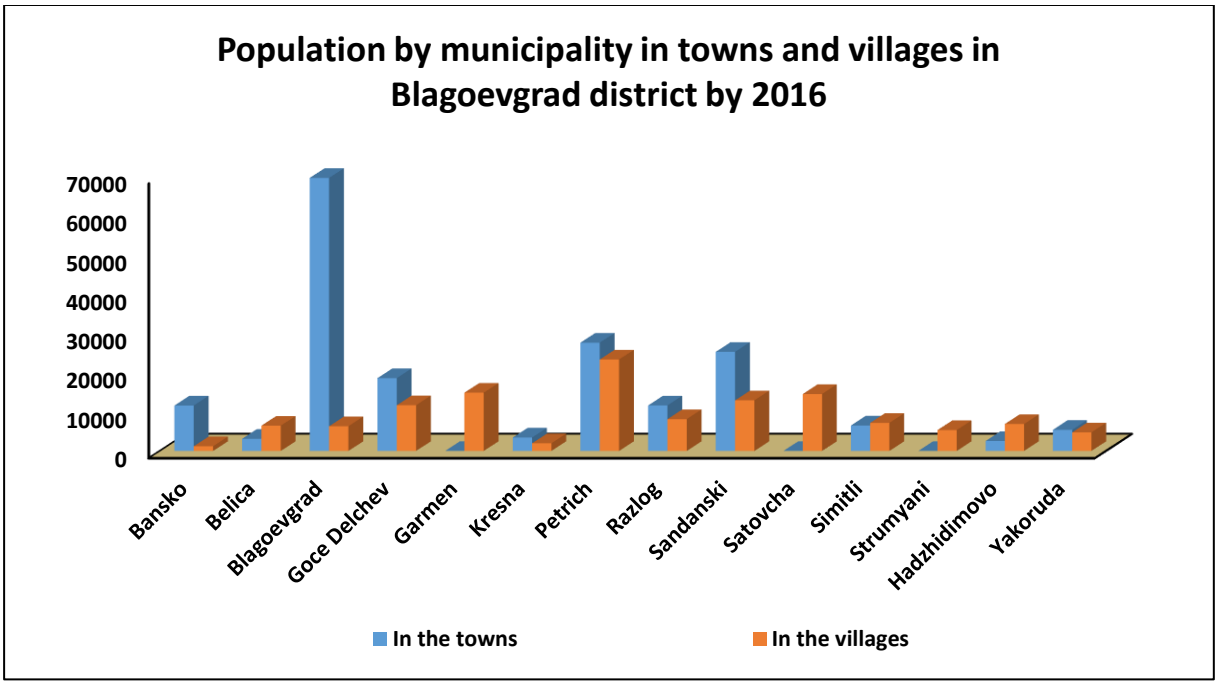
Chart 2.



Source: NSI

A total of 185 060 people live in the cities, while in the villages the people are 125 261. The urban population has a share of 59.64% from the total population of the area, compared to 40.36% for the rural population.

Chart 3.

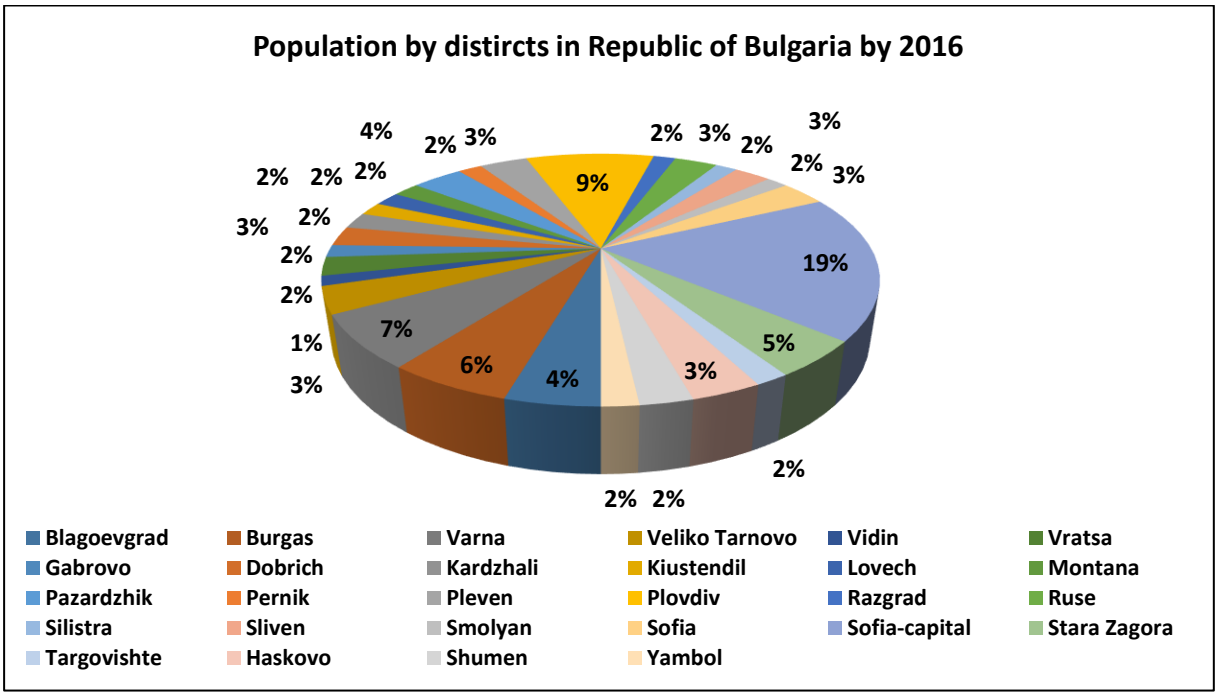


Source: NSI

The municipality of Blagoevgrad has a leading position in the district regarding the share of the urban population in the region - 37.59%, followed by the municipalities Petrich - 14.91% and Sandanski - 13.65%. The structure of the population by place of residence in towns / villages at national level is 73.28%. It is a characteristic feature of the area that the indicators for the share of the population in towns and villages are relatively close. Blagoevgrad District is an attractive place to live, because in comparing the 28 districts in the country by population, it is ranked sixth with a share of 4.37%. Expected highest concentration of people is observed in Sofia-capital district with the impressive 18.64%. Plovdiv, Varna, Bourgas and Pazardjik are among the top five preferred areas of residence.

This is confirmed by the data in the following chart:

Chart 4.



Source: NSI

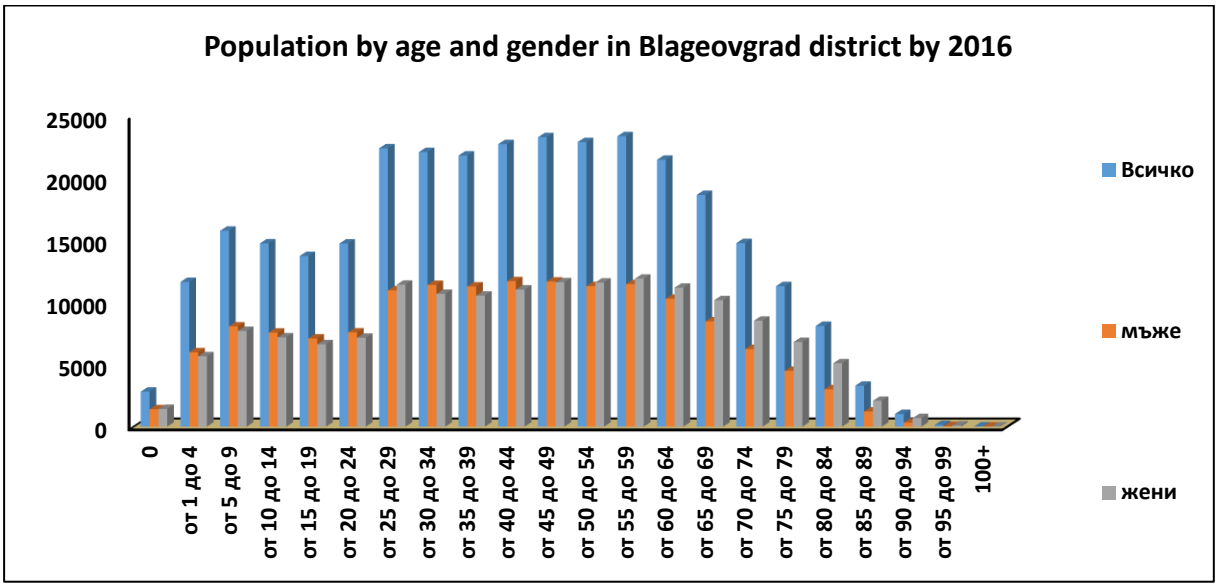
The age structure of the population aged 55-59 and 45-49 years have the largest relative share in the region, followed by the population between 25-29 years. Typical of this indicator is that most age groups are represented equally. The share of the working population in almost all municipalities is high, which is a good indicator for the economic activity of the population.

This indicator is also essential for the reproduction of the population. The territory of the region has a favorable age structure - the share of the old people is relatively low and the birth rates are high. To a great extent, the positive trends are due to the presence of universities in the regional center of the territory - Blagoevgrad. The following table provides information on population by age and gender in the area.

In the gender structure of the population, the share of women (48.77%) and men (51.23%) is very close. Men are more than women in young age groups. With increasing of the age the number and share of women from the total population is increasing, which is related to the total and age mortality rates of both genders.

Taking into consideration the favorable production potential, the normal age structure and the high share of working population in the district, the prospects for achieving socio-economic development are extremely advantageous.

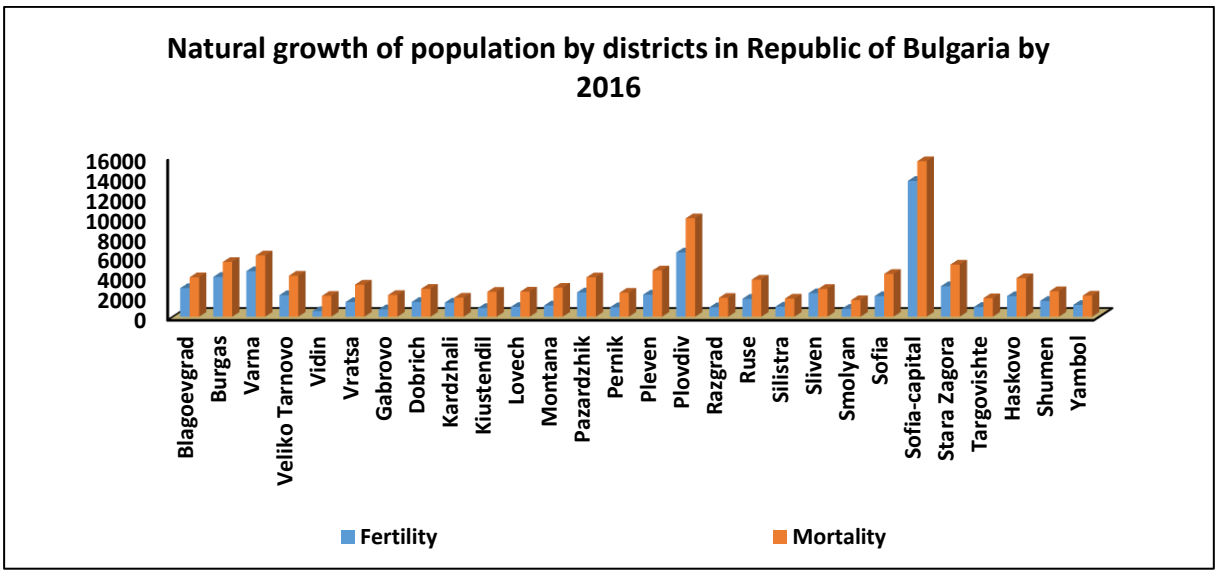
Chart 5.



Source: NSI

The population dynamics trend towards 2016 is negative at both district and national level. The following chart shows birth rates and mortality rates in the 28 districts of the country.

Chart 6.



Source: NSI

The level of population mortality in the country is high compared to other EU countries. The negative trend covers almost all settlements with some exceptions.

The natural population growth in the area is negative (-38.00%), but it is lower than the country's (-39.17%).

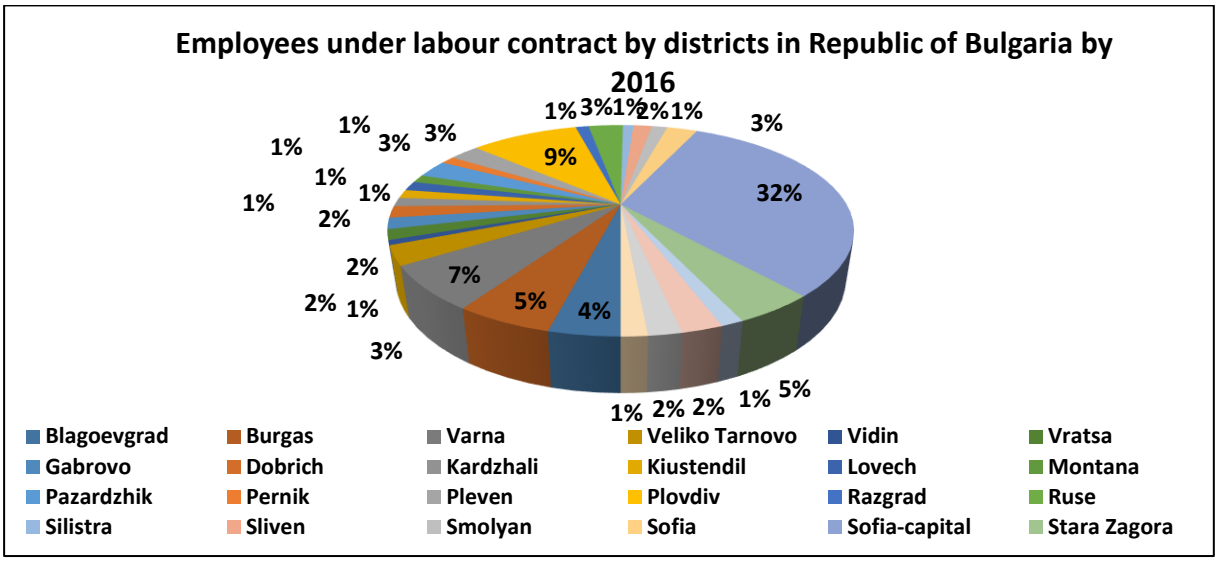
The birth rate in the region is relatively high - 4.37%, which places Blagoevgrad in fourth place on this indicator compared to other districts.

The highest mortality rate was registered in Sofia-capital district, 14.43%, followed by Plovdiv (9.13%), Varna (5.68%) and Bourgas (5.08%). Blagoevgrad ranks sixth place with 3.66%, after Veliko Tarnovo (3.80%).

1.1.10. Economic activity of the population

According to the data of the National Statistical Institute in 2016 the number of employees in Blagoevgrad district is 89 355, which represents a relative share of 4% compared to the other regions in the country.

Chart 7.



Source: NSI

The district is in sixth place on this indicator, compared to other districts.

The rate of economic activity of the population between 15 and 64 years of age in Blagoevgrad district is 69.8%. The high share of the working population is due to the favorable age structure of the population.

In relation to the economic activity of the population, information on the number of employed persons and the employment rate by districts at the end of 2016 is given in the following table.

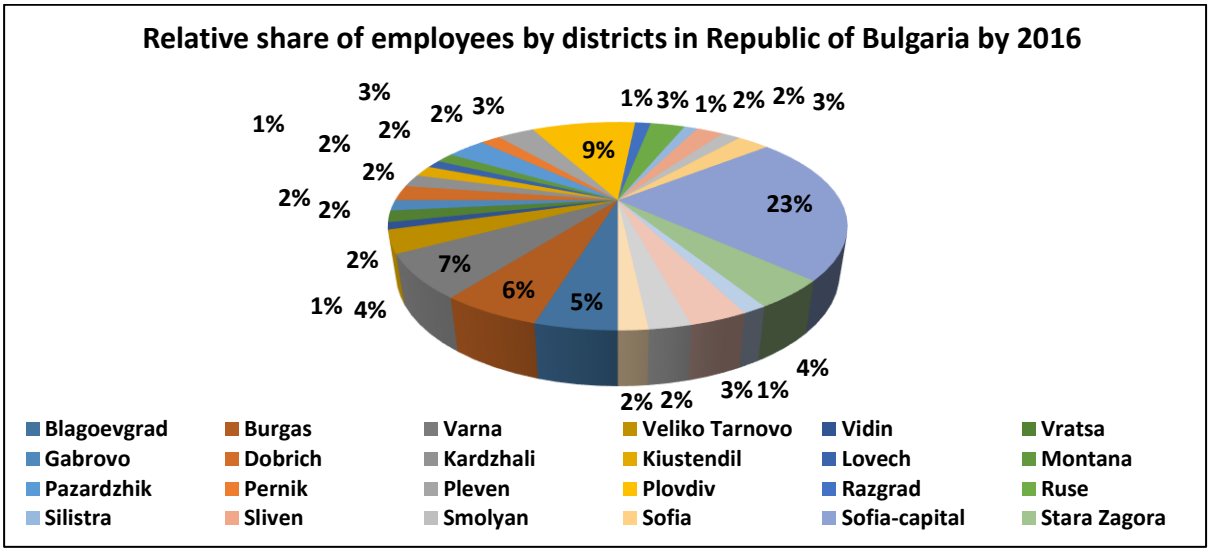
Table 2

Districts	Employed persons – thousands			Employment rate - %		
	total	men	women	total	men	women
Vidin	32,2	17,6	14,6	60,7	64,0	57,2
Vratsa	53,3	30,4	22,9	49,9	55,3	44,3
Lovech	37,0	20,2	16,8	47,3	50,1	44,3
Montana	44,8	25,	19,8	54,5	58,7	49,9
Pleven	94,9	51,4	43,4	62,6	66,4	58,6
Veliko Tarnovo	102,5	55,1	47,3	65,3	69,9	60,7
Gabrovo	47,2	23,9	23,4	68,7	67,5	69,9
Razgrad	41,5	21,5	20,0	54,3	55,1	53,5
Ruse	90,7	48,7	42,	62,4	65,4	59,4
Silistra	35,3	18,8	16,5	49,6	51,6	47,5
Varna	198,5	109,0	89,5	63,0	68,8	57,1
Dobrich	70,5	38,9	31,6	60,5	65,7	55,1
Targovishte	40,1	22,3	17,8	54,2	59,0	49,2
Shumen	69,2	37,9	31,3	60,4	64,9	55,7
Bourgas	166,3	92,7	73,5	61,2	68,3	54,0
Sliven	70,7	38,5	32,2	59,4	63,8	55,0
Stara Zagora	129,0	70,4	58,6	63,1	68,2	57,8
Yambol	49,5	26,2	23,3	64,7	66,6	57,8
Blagoevgrad	136,7	69,9	66,9	65,4	66,5	64,2
Kyustendil	49,8	25,4	24,4	65,0	64,8	65,3

Districts	Employed persons – thousands			Employment rate - %		
	total	men	women	total	men	women
Pernik	51,7	26,6	25,1	65,4	65,5	65,2
Sofia	84,3	49,0	35,3	56,1	63,2	48,6
Sofia (capital)	671,3	344,3	327,0	73,7	76,7	70,8
Kardzhali	59,0	32,1	26,9	58,2	61,9	54,4
Pazardzhik	99,3	55,9	43,5	58,4	64,3	52,2
Plovdiv	271,9	141,1	130,9	62,1	64,5	59,8
Smolyan	48,5	25,3	23,2	66,0	67,5	64,4
Haskovo	96,4	54,6	41,8	64,1	70,9	57,0

The relative share of employed persons by districts is shown in Chart 8.

Chart 8.



Source: NSI

According to the information given in the table, the employment rate of the population in Blagoevgrad district is 65.4%, of which - 66.5% are men and 64.2% are women.

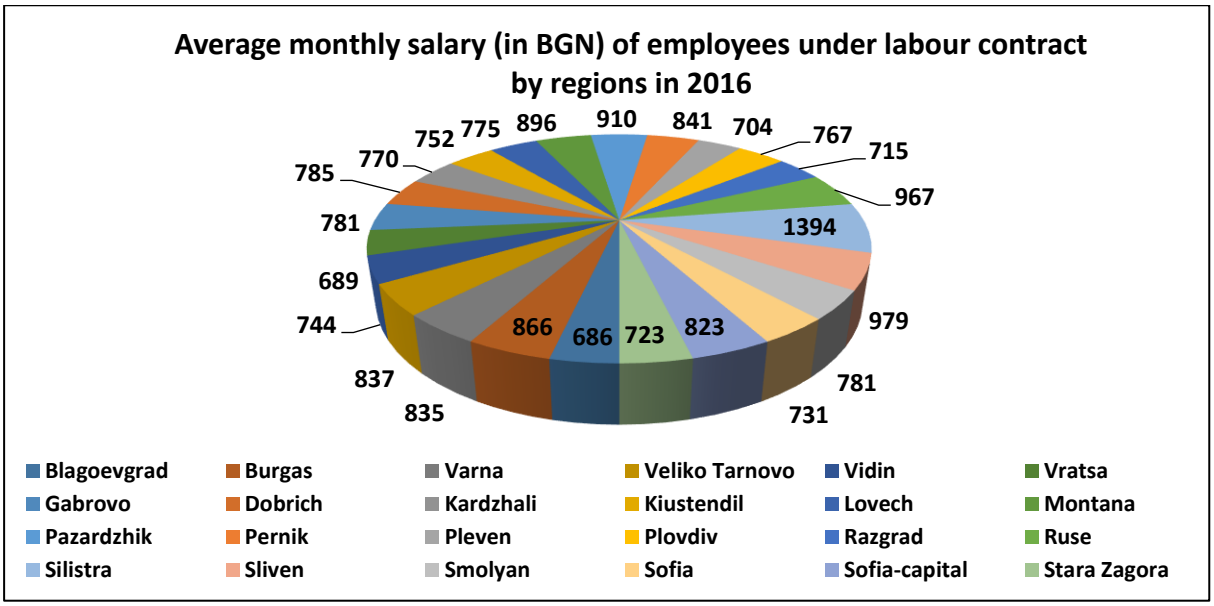
Blagoevgrad District is ranked sixth in this indicator, ahead of Veliko Tarnovo, Rousse, Burgas and Varna.

Despite the favorable indicators for the economic activity of the population, Blagoevgrad district has the lowest average monthly salary of BGN 686.

A welfare criterion for the region of residence is the information on the income of the population in the region, as the wage level affects the number, employment and age structure of the population, migration, productivity, living standards, etc. The level of wages in the country is considerably behind the other EU Member States. One of the main priorities of the Bulgarian government is to raise income and achieve a good standard of living. It should be noted that progress has been made in this respect, as statistics show wage increases at national level. Of course, serious work is forthcoming in this direction in order to achieve the desired results, but this will take a long time, as we have noted in the text above.

The following figure contains information on average monthly wages by districts in 2016.

Chart 9.



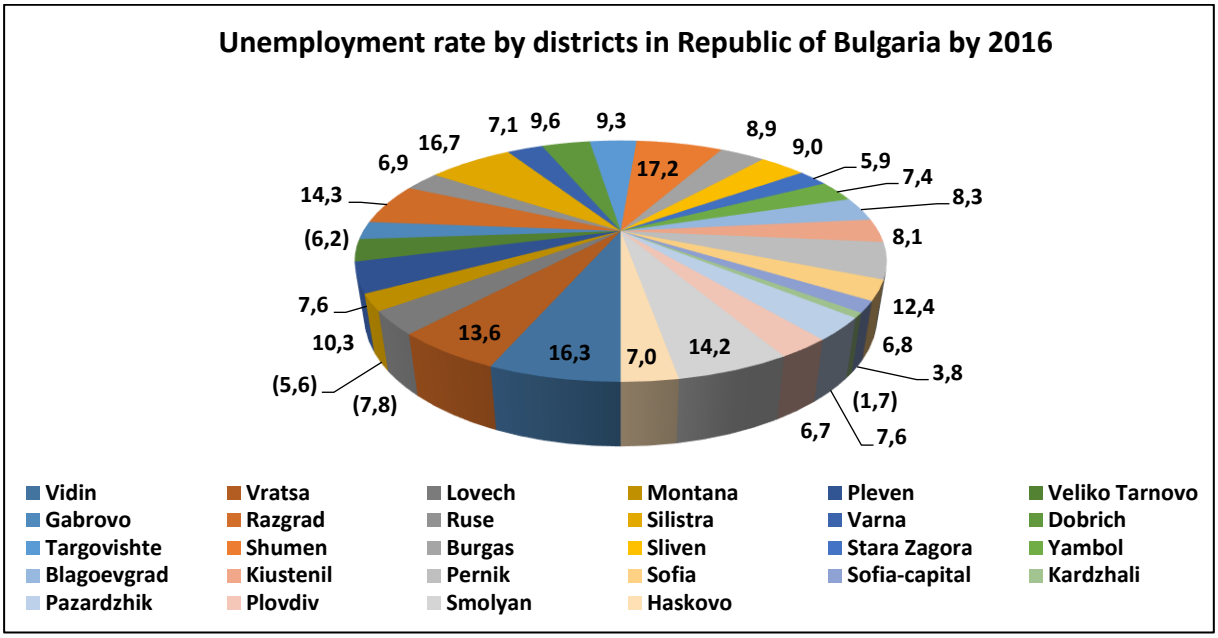
Source: NSI

The highest average monthly salary of the employed persons is observed in Sofia-capital district - BGN 1 394, followed by the districts of Varna - 1 014 BGN, Stara Zagora - 979 BGN, Sofia - 967 BGN. In Blagoevgrad district the level of the indicator is lowest - 686 leva. The difference in the salaries compared to the first three regions is approximately BGN 300, which can be explained by the lack of economic entities in the region operating in high added value sectors.

According to NSI data presented in the following chart, the registered unemployment rate in Blagoevgrad district in 2016 is 8.3%, which is lower than the country average of 9.2% but it is still high enough compared to the indicator in Sofia capital district - 3.8%.

The total number of registered unemployed persons in the district by the end of 2016 is 12 200 people.

Chart 10.



Source: NSI

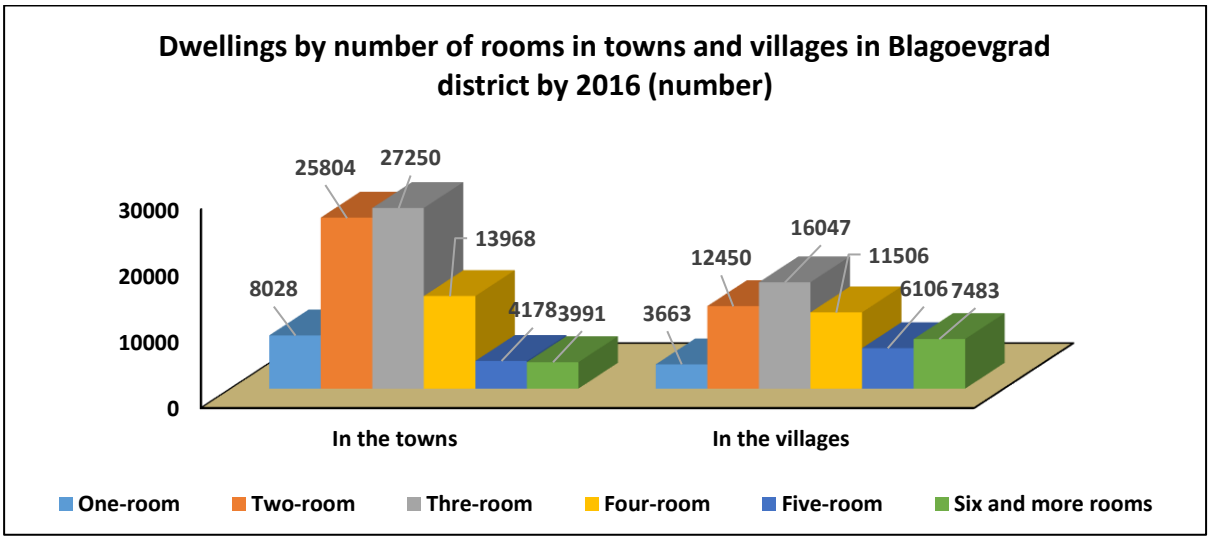
1.1.11. Housing sector

The total number of dwellings on the territory of Blagoevgrad district by the end of 2016 is 140 474, the useful floor space is 6 729 033 m2. The relative share of the number of dwellings in the district - 3.56%, is close to the average for the country - 3.57% and according to this indicator, the district is at the ninth place compared to the other 28 districts.

The massive introduction of large-panels and other industrialized technologies in the mid-70s and their long years of production (even in small towns) along with the relative improvement in housing conditions, now appears to contribute to decreasing the overall physical qualities of the housing fund and of the settlement environment due to long service life, the old production technologies, the need to introduce energy efficiency measures to contribute to the reduction of energy consumption.

Figure 11 contains information on the distribution of dwellings by number of the rooms in the cities and villages in the district.

Chart 11.



Source: NSI

The relative share of dwellings in the cities is 68.67% and in the villages 31.33%. The dwellings with three-rooms (43297) and two-rooms (38254) are the largest number in the district, both in the cities and in the villages.

Data from statistical offices show that housing provision per 1,000 inhabitants in the region is 453 while the average is 555, which means the district is more than 100 points behind. Almost all dwellings have a high degree of improvement.

The main indicator of the population's housing provision is the average living area per dwelling, which per capita for the area is 21,68 m2, a value close to the country indicator - 27,52 m2.

Based on the above statistical information, we can summarize that housing on the territory of the district is good but it is imperative to carry out capital repairs and introduce energy efficiency measures because of the poor reliability of the communal facilities performance due to the poor quality and marginal amortization.

1.1.12. Healthcare

According to NSI data, the health establishments for hospital care in the territory of Blagoevgrad district are 12 in total by the end of 2016, including: multi-profile hospitals - 6 and specialized hospitals - 5. The out-patient health care establishments in the district are 73, including: medical centers - 26 pcs; medical-dental centers - 4 pcs; independent medical-diagnostic and medical-technical laboratories - 43 pieces.

In the regional center - Blagoevgrad, there is a multiprofile active treatment hospital that serves the population of the region with a center for emergency medical care and a center for hemodialysis. The other hospitals are located in the towns of Petrich, Gotse Delchev, Razlog

and Sandanski and serve the municipalities in the district, which have no health care establishments.

The unfavorable tendencies in the healthcare sector in terms of reducing the number of medical staff are also occurring in Blagoevgrad district.

The availability of hot mineral springs is a favorable prerequisite for the development of balneological tourism and specialized hospital facilities for rehabilitation.

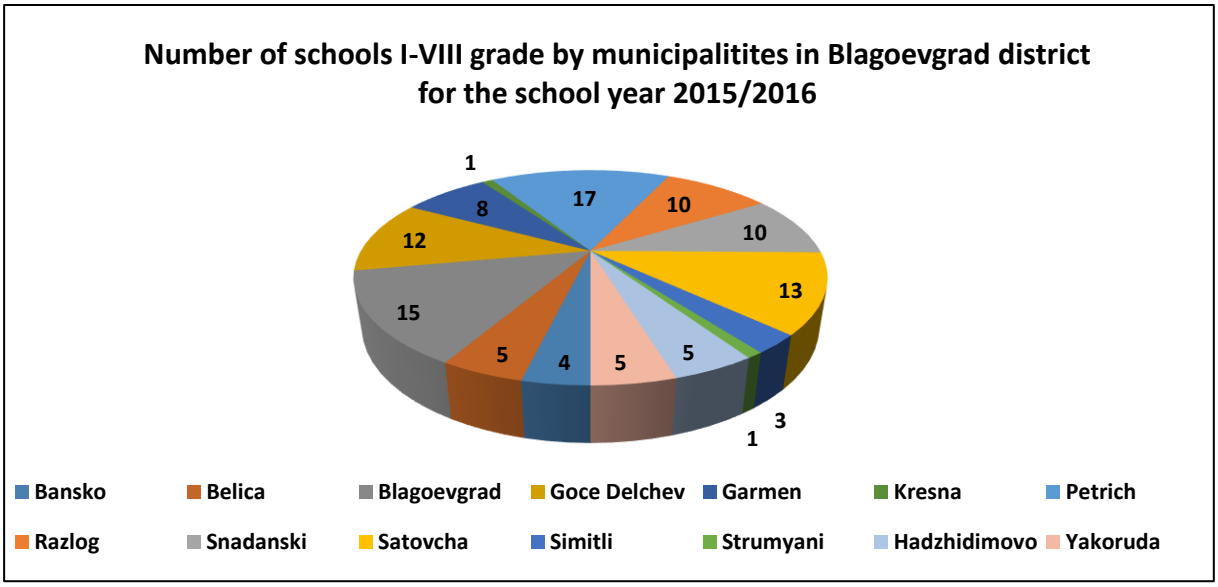
1.1.13. Education

The level of education in Blagoevgrad district is relatively high. In the regional center - Blagoevgrad, there are two higher education institutions - Southwest University "Neofit Rilski" and the American University in Bulgaria - Blagoevgrad, which teach subjects in the fields of social and humanities, law, economics and business administration. There are also a Medical College in the structure of the Medical University - Sofia, as a separate legal entity, Technical College in the structure of South West University - without legal entity status and Private College of Tourism - Blagoevgrad with private status.

According to NSI data, graduates by the end of 2015/2016 are 2 289, the number of college and other specialized higher schools teachers for the same period is 439.

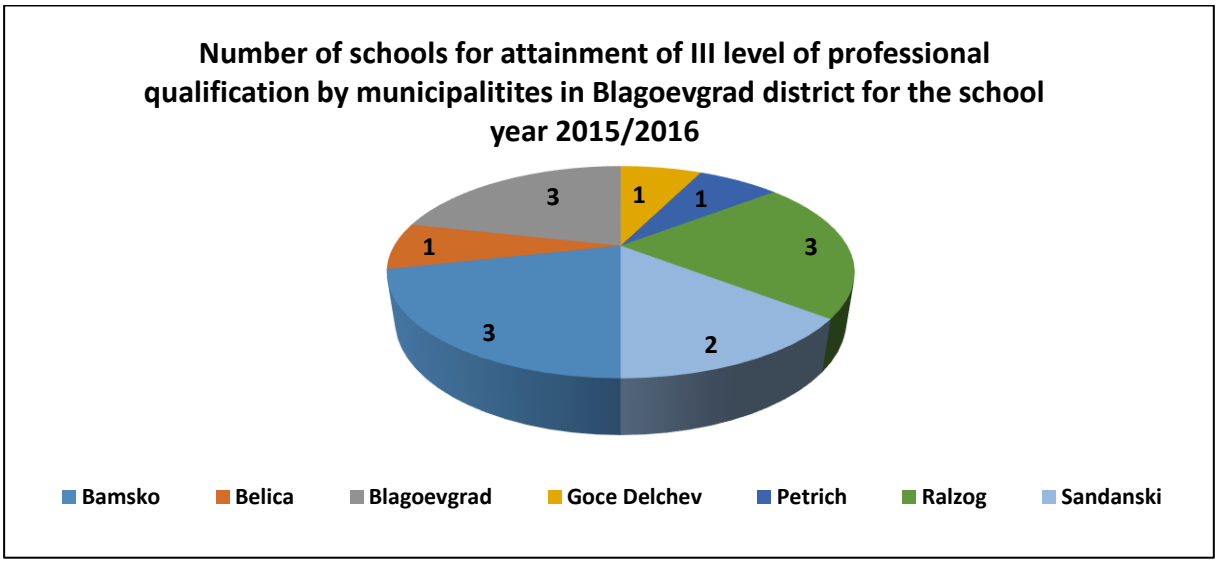
The total number of schools (primary and secondary education) in Blagoevgrad district is 123.

Chart 12.



Source: NSI

Chart 13.



Source: NSI

It is typical for the district that technical schools and vocational schools are built and operate only in the municipalities centers, while the secondary schools are built, both in the municipal centers and in the other settlements.

Pupils who have completed basic education in the district during the school year 2015/2016 are 2 318 and those with secondary education - 774. Blagoevgrad district ranks sixth in this indicator compared to other districts.

Some of the main problems of the education system, both at national and regional level, are the training of staff in specialties which are in line with the needs of the business and the provision of the necessary means for conducting training in normal conditions, including the availability and maintenance of the relevant material- technical base.

Solving the existing problems can be achieved by combining the joint efforts of national and regional authorities and implementing of certain structural reforms, which take a lot of time to be realized.

An advantageous prerequisite for the achievement of the scientific and practical potential for the development of the district as a whole is the presence of higher education institutions, colleges and vocational schools.

1.1.14. Economy

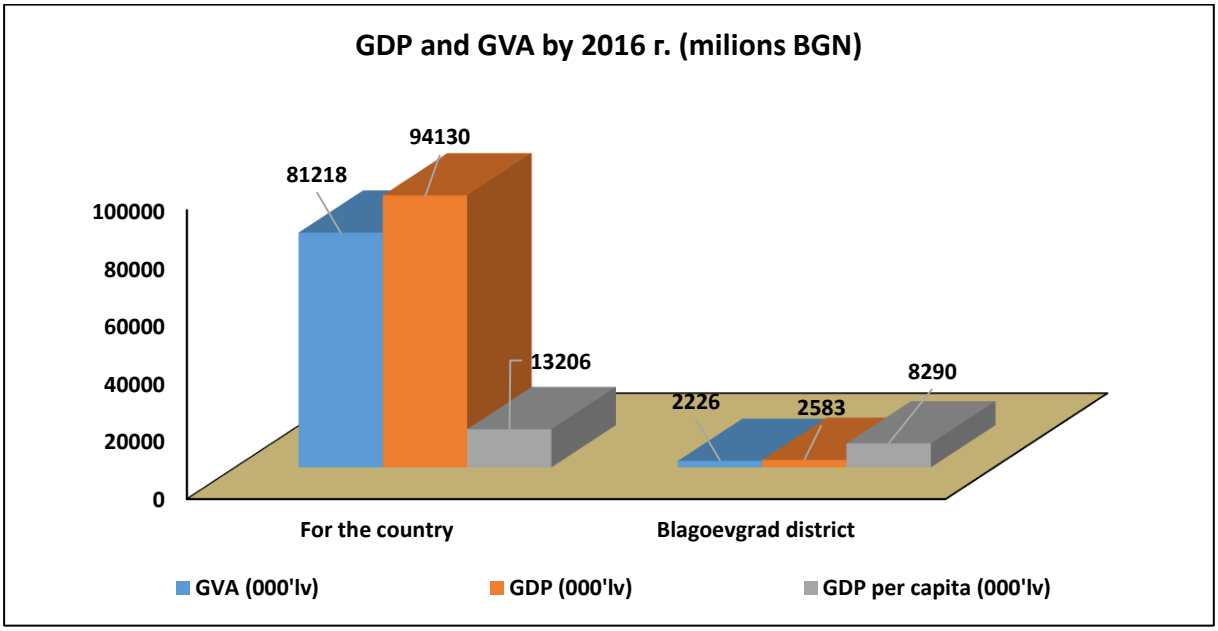
All sectors of the economy are represented in the region, especially the production of coal / brown and lignite / and building materials.

The semi-mountainous and mountainous reliefs favor the provision of raw materials - wood for logging and wood-processing industry, respectively for the paper industry, for the development of livestock and agriculture.

The availability of mineral springs is a good prerequisite for investment in holiday facilities, hotel accommodation, specialized health care establishments.

Indicators for the district's economic development are the Gross Domestic Product (GDP) and Gross Value Added (GVA). These are shown in the following chart:

Chart 14.



Source: NSI

The indicators are much lower than the average for the country and this states a slowdown in the economic development of the region.

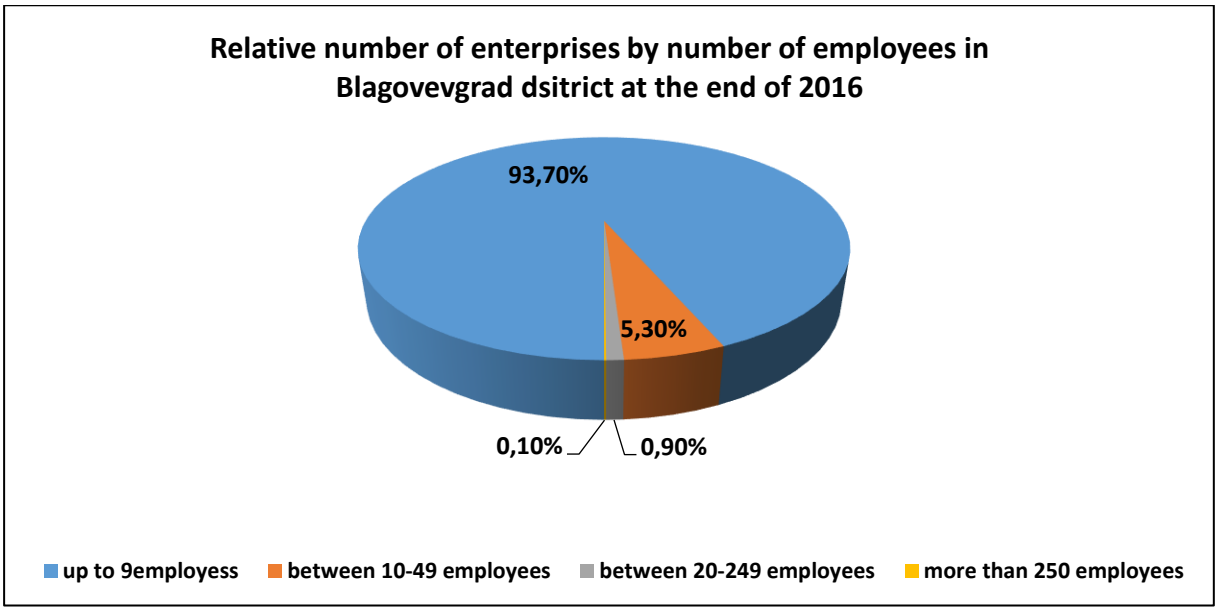
According to NSI data, foreign direct investment in non-financial corporations has grown steadily over the last five years and by the end of 2016 they amounted to 482,986.70 (thousand euros).

At the end of 2016 there was an improvement compared to the previous years on the turnover of the enterprises in the region, reaching the amount of 6 5554 553 (thousand BGN) and the production of 4 876 689 (thousand BGN).

An important indicator for growth is the investment made for the purchase of fixed assets by enterprises in the region. In 2016, they amounted to 427,467 (thousand BGN) or 2.43% of this indicator's value at country's level.

The predominant number of companies in the district by 2016 are micro and small enterprises, and the relative share of medium and large enterprises is approximately 1%.

Chart 15.



Source: NSI

Compared with data from previous periods, the dynamics of the structure of enterprises is insignificant.

1.1.15. Industry

The industrial enterprises operating on the territory of the district are unevenly distributed, with 50% of them being concentrated in Blagoevgrad municipality. The low share of structurally identifying enterprises in the region outlines trends in the reduction and fragmentation of the production, resulting from the restructuring of the economy on a market principle, which led to the liquidation of large enterprises.

According to the information provided by the Territorial Statistical Bureau, industry has the leading position in terms of production and number of jobs, the trade and transport sectors are following it.

Although machine building and electronics are leading in the district, textiles, knitwear and clothing are traditionally one of the main and most important sectors for the industrial development of the region.

The agro-food industry, including meat processing and production, processing and preserving of fruits and vegetables, production of vegetable and animal fats, production of milk and dairy

products, milling products, bread, bakery and confectionery, ready-made foods, pasta, soft drinks and alcohol.

Industrial centers in the district are the municipalities of Sandanski, Petrich and Gotse Delchev. In Gotse Delchev municipality there is a well-developed light industry, food processing, construction and wood extraction.

Construction and tourism have been developed in the municipality of Bansko, but in recent years the share of output in the construction sector has been decreasing, yet it has a decisive impact on the economy in the municipality.

The main branch of the economy in the municipality of Garmen is the mining industry - stone-lining materials, lignite coal, wood, but in general this branch is poorly developed.

Similar are the data on the economic development of the municipality of Petrich, which indicate that the largest share is the production and employment in the processing industry, followed by services and transport.

In Razlog municipality are developed the economic sectors trade, repair of motor vehicles and motorcycles, hotels and restaurants and processing industry. The available resources on the territory of Razlog municipality are a favorable prerequisite for the development of branches related to timber harvesting and processing. Construction is underdeveloped and fails to recover from the negative effects of the global financial and economic crisis.

The services sector has the largest relative share in the number of companies in the municipality of Satovcha. Industry is underdeveloped.

The statistics show that the industrial and construction sectors are of the greatest importance for the economy of the municipality of Hadjidimovo. In the industrial sector operate more than 20% of the companies, more than 80% of the production is produced and approximately 85% of the employment in the municipality is provided.

The structure of the economy of the Yakoruda municipality is dominated by companies operating in the field of trade, repair and service, followed by those in the manufacturing, hotel and restaurant industries and, last but not least, the companies involved in construction, sport and culture.

1.1.16. Construction

According to the national statistics, the construction sector produces more than 1/3 of the production in the district and together with industry are decisive for the development of the regional economy. The negative effects of the economic crisis acutely influenced the construction companies across the country and they made significant losses. Data from statistical analyzes of NSI indicated that active processes in the development of negative impacts in construction started as early as the end of 2008. In 2010 there was a significant

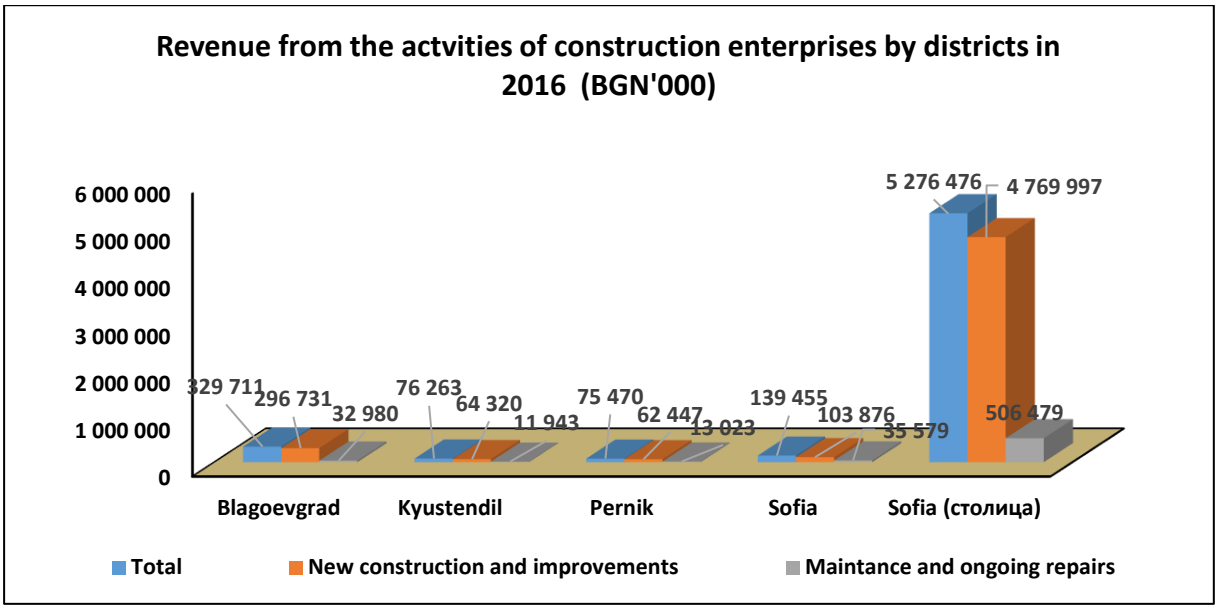
decline in total construction output in the country by 10.66% compared to the same period of the previous year. The provided data are an objective evidence of the enormous economic pressures faced by building contractors. However, one of the segments of the construction sector, such as engineering (low) construction, is steadily growing, supported by the acquiring of European funds and programs and the country's operational programs.

In recent years, a recovery process has begun, which has contributed to stabilizing the regional economy and has brought the district to one of the top positions in the competition with other regions in regards to the activities of the construction companies.

The positive trends in the sector at the regional level are in line with the indicators at the national level.

Blagoevgrad district is ranked second for the indicator "Revenues from the activity of construction enterprises" with a total of 329 711 (thousand BGN), as follows:

Chart 16.



Source: NSI

1.1.17. Agriculture

In most of the municipalities in the district the agriculture sector is a major source of income for the population. Blagoevgrad district ranks first in terms of number of farms compared to other districts. According to data from the Ministry of Agriculture, Food and Forestry since the last census of agricultural holdings, the total amount of used agricultural land in the district is the significant 583 588 decares. A typical feature of the district is the high share of tobacco, potatoes, tomatoes, peaches and grapes.

The mountainous relief provides a favorable prerequisite for the development of livestock farming, given the volume of the grassland. The data from the official site of the Blagoevgrad district administration show that the arable land is approximately 155 thousand decares.

Corn, wheat, barley and oats predominate in the structure of agricultural crops, which is determined by the favorable climatic conditions and the specific peculiarities of the relief.

Vegetable production is mainly concentrated along the Struma River, due to the good soil characteristics and the availability of water-efficient infrastructure, which provides opportunities for irrigation. Priority crops are potatoes, followed by pulses and fresh vegetables, with no significant changes in occupied areas in recent years. A significant proportion of vegetables are produced in family gardens, the production is oriented to personal needs and is not sold on the market. The presence of geothermal springs in Blagoevgrad district is a good prerequisite for the development of greenhouse production of flowers and vegetables.

The oil crops occupy an insignificant share of the arable land in Blagoevgrad district and are represented almost entirely by the sunflower. In view of the change in climatic conditions caused by global warming, the production of non-traditional crops such as oilseeds has prerequisites for development.

The orchards in Blagoevgrad district are situated on an area of 6 546 ha, forming 37.5% of the fruit-growing areas in the Southwest Planning Region and 6.9% of the respective areas in Bulgaria. The vineyards cover 4,705 ha, which means 72.6% of the vineyards in the Southwest region and 4% of the country's vineyards concentrated on the territory of the region.

The development of livestock farming in Blagoevgrad region is favored by climate and natural resources. The high relative share of permanently grassed lands on the territory of the region creates excellent conditions for the development of pastoral livestock.

Most of the animals in the region are grown in the private sector, with a large share of animal production not having a commodity character and remaining to meet the needs of the producers and their families.

The growth potential of the sector is related to the opportunities for the development of pastoral livestock farming in the dominance of the processing sector and the production of certified ecologically clean products. There is a need to promote competitiveness by increasing productivity, increasing the rate of technical innovation and innovation.

1.1.18. Forestry

Forestry on the territory of Blagoevgrad district is relatively well developed. In terms of the territorial structure, forests and forestry areas in the Southwest Planning Region are united in three Regional Forest Directorates with a total forest area of 1,050,483 ha. The Forestry Fund

in Blagoevgrad district covers 394,648 ha, which accounts for 37.6% of the total forest area of the Southwest Planning Region. The wooded area formed 83.8% and the non-wooded area - only 3.9% of the district's forest fund. 387,029 ha (98.1%) form a state forest fund, 424 ha (0.1%) are municipal forests and only 7,192 ha (1.8%) of the forests in the area are privately owned. The prevailing state ownership of the forest fund stems from the presence of the territory of Blagoevgrad district of the two national parks - Rila National Park and Pirin National Park.

The forests in Blagoevgrad region maintain the biological balance, improve the climate, regulate the water regime and protect the agricultural lands, roads and settlements from erosion processes. The importance of forests also determines the opportunities for development of a number of municipalities in the region, where the main and additional incomes of a significant part of the local population come from logging, wood processing, mushrooming, herbs and forest fruit production. Although the economic significance of the forest fund in the region is mainly related to winter tourism, the forest ecosystems create favorable conditions for the keeping of sustainable game populations, which is a prerequisite for organizing and developing domestic and international hunting tourism.

The economic importance of both wood as a traditional resource in the Blagoevgrad region and of the preserved soils, water resources and oxygen balance will increase in the future, which necessitates the establishment of regimes for the integrated use of forests and their optimal reproduction.

1.1.19. Tourism

The sector is of significant importance for the regional economy and structurally defining for the economy of the municipalities of Bansko and Sandanski. The territory of the area has a varied and beautiful relief and natural landmarks.

Tourism has a main priority in Bansko municipality and has helped to establish it as an attractive destination, which is popular not only at national, but also at European and world level. The built hotel infrastructure is one of the most modern and there is accommodation provided for a large number of tourists. Of course one of the greatest natural resources in the territory are the warm mineral springs and their healing properties.

The town of Sandanski is a traditional resort where balneological procedures, well known in Bulgaria, as well as on the Balkans, are carried out. The favorable climate contributes to the healing of many respiratory problems and attracts a significant number of tourists. There are cultural and historical landmarks in the surrounding areas of the town and the municipality. In the town of Melnik, for example, there are interesting traditions in the field of wine making, the architecture of the local houses and there are sand pyramids.

Places of interest in the area are also the Melnik fortress and Rupite area - a wonderful place for calmn relaxation and reflaction.

The Municipality of Razlog has a tradition in organizing and conducting the kukeri's festival (costumed Bulgarian men, and sometimes women, who perform traditional rituals intended to scare away evil spirits). It is popular among the tourists. The municipality also provides suitable conditions for recreation in Predela resort area. There are golf courses, spa, holiday complexes and guest houses on the territory.The municipality has a well-developed tourist facilities.

A well-known tourist destination with well-developed hotel infrastructure is the town of Dobrinishte.

The Municipality of Gotse Delchev and its adjacent territories is rich in cultural landmarks and has the following famous tourist destinations:

- the regions of Kovachevitsa, Leshten, Dolen villages - rural tourism is successfully developed. Also important is the village of Delchevo;
- the region of Ognyanovski mineral springs, where many hotels are built;
- the area of the mountain resort Popovi Livadi.

The Blagoevgrad area, where the administrative center of the district is located, is characterized by a varied architecture, where many young people live and learn because of the presence of universities. The town has significant potential for the development of balneo tourism, ski tourism and congress tourism, given its location - near the Struma river valley and the southwest slopes of Rila mountain. Remarkable relief forms, which by their attractiveness and uniqueness are an extremely valuable tourist resource within the region are the high mountain peaks of Rila and Pirin, Bistritsa circus, karst forms in Vlahina, etc. In addition, Blagoevgrad and the Bodrost resort are the starting point for the Rila trails, as well as the oldest reserve in the country: Parangalitsa.

The mountainous relief, the clean air, the pristine territories and the presence of a very good hotel infrastructure in the area contribute to the provision of suitable conditions for all types of tourism - eco, rural, winter, summer, off-road, rafting, etc.

1.1.20. Short comments on the economic development of the region

The main favorable conditions for the development of tourism on the territory of the district can be summarized as follows:

- Diverse relief, natural landmarks and profuse cultural and historical heritage;
- Well-developed tourist facilities and hotel accommodation to provide all types of recreation and leisure activities;
- Availability of mineral springs.

The advantages of Blagoevgrad district in 2016 regarding the economic development of the region can be summarized as follows:

- Increase in the employment rate of the population;
- High economic activity of the population;

- Reducing unemployment;
- Improving the educational structure of the population;
- Increased investment in the region;
- High export potential;
- Good transport provision;
- Resource reserve with timber;
- Prolific intentions of the regional authorities to achieve economic development;
- Presence of minerals for construction;
- High activity in the implementation of projects funded under the European Funds;
- A large area of agricultural land;
- Highly developed tourism.

The welfare of the population in the Blagoevgrad district is increasing in 2016, but it remains below the average values for the country. Local taxes and fees for the region are relatively low, which supports the efforts of the regional authorities to attract investment in order to improve people's living standards.

The data analysis on the development of the economy in the district shows that there is a potential for development above all in the manufacturing and tourism sectors of the industry.

In addition to positive, there are also negative factors influencing the economic development of the region, summarized as follows:

- The existence of an insignificant number of structurally identifying enterprises;
- A large number of small and medium-sized enterprises, which poses a risk of structural instability;
- Foreign investment in industry sectors which do not conduct high added value and employment;
- The main sectors that make the biggest contribution to the regional economy and determine its profile are services - trade, hotels and restaurants, and secondly the industry;
- The development of technological production on the territory of the district is low;
- Shortage of staff, meeting the needs of the business in the region;
- High indebtedness between the companies;
- Difficult admission to financing;
- Decrease in the production of Bulgarian fruit and vegetables compared to previous periods;
- Difficult realization of production and low purchase prices;
- Lack of investment to modernize farms, low competitiveness;
- Lack of regional markets and exchanges for the sale of the produced agricultural production;
- Fragmentation of agricultural lands, necessity of consolidation;
- Lack of risk-sharing and land-use organizations on the cooperative principle;

- Low salary levels;
- Poor state of the water infrastructure and limited access to water resources for irrigation.

In view of the above analysis, it is advisable to pursue a purposeful policy in the sphere of education, aimed at preparing highly qualified personnel for the business in the sectors of Industry, Agriculture and Tourism, providing investment for modernization of agricultural holdings, creation of "collective forms" for the management of agricultural lands, ensuring wide publicity about the possibilities for financing under the European funds and programs. All this will contribute to the stabilization and development of the economy in Blagoevgrad district.

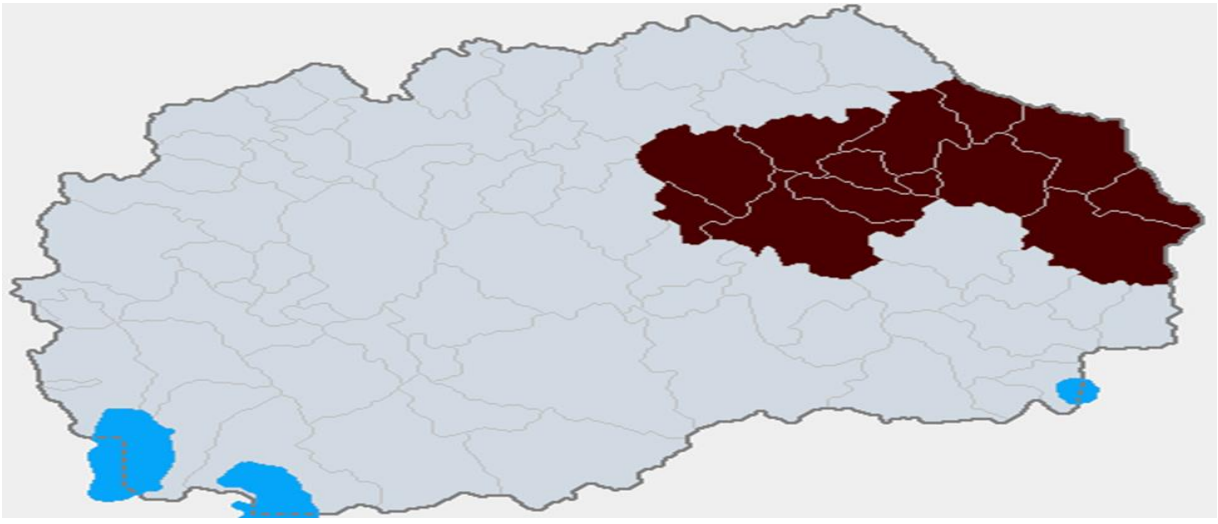
2. Analysis of the current situation in the East planning region of the Republic of Macedonia

2.1. Statistical data

2.1.1. Geographic location

The East planning region of Macedonia covers the territory of Bregalnitza river basin in the southeastern part of the Republic of Macedonia and occupies 14% of the territory of the Republic of Macedonia. It is located between the Northeast, the Vardar and the Southeastern planning region and borders with the Republic of Greece- to the South and the Republic of Bulgaria to the East. The total area of the territory included in the region is 3,537 square meters.

Fig.2



2.1.2 General characteristics of the territory

The region is divided into 11 municipalities (Berovo, Vinnitsa, Delchevo, Zarnovtsi, Karbintsi, Kochani, Macedonian Kamenitza, Pehchevo, Probhtip, Cheshinovo-Obleshevo and

Shtip), which are divided into 217 settlements. 209 of them are rural settlements. The administrative center of the region is the town of Stip.

2.1.3. Relief

The Eastern region has a dynamic relief including the plains Shevchenko, Jegov pole, the area around the Bregalnitsa river, Pijanets valley, Maleshevska valley, Vinichko-Kochanska Kotlovina, Berovo - Pehcheva Kotlovina and slopes composed of sediments, delluvial soils, large hilly area and predominantly agricultural production, as well as mountains such as Osogovo, Plachovitsa, Serta, Konechka, Maleshevo, Ograzhden, Vlahina, Ojjena and Golak.

Protected Areas

The East planning region is not characterized as a representative high nature value protected area, but Mount Osogovo is a new, proposed protected zone, in line with its established values. The reasons for proposed protection according to the layout are based on geomorphological value, landscape conservation, biodiversity conservation, hydrological value and water resources.

The mountains in Osogovo have important biological values. There are a number of internationally and nationally significant species of flora and fauna of which a significant part are endangered, endemic or rare species.

In addition, Osogovo is identified as: Important Plant Area (IBA), Important Bird Area (IBA), an Important Corridor for wild flora and animals' movement within the PEEN SEE and Emerald regions. Interaction between people and nature in Osogovo is characteristic and is of great importance to be encouraged and protected.

That is why the protected area will provide protection for the natural values and the sustainable economic development of the region. Of the 18 habitats registered under the EUNIS Habitats Classification System, five of them are important for protection under the Habitats Directive. There are 1007 registered types and subtypes of plants, of which 18 are registered in Osogovo, among them: Viola biflora, Anemona narcissiflora, Myriophyllum verticillatum, Pulsatilla montana ssp. In the mountain peak Tsarev Verv is the only locality Genista fukarekiana (endemic plant located only on the mountain Osogovo), Hypericum maculatum ssp. Maculatum and viola biflora. There are 258 registered types of macromycetes and 24 mammalian species. There were 133 species of birds, of which 36 are important species. Ratka Rock is a particularly important ornithological site. 10 species of amphibians and 21 species of reptiles were found. There are 11 species of known fish, eight of which are part of the IUCN red list. At Osogovo there are 16 registered Balkan endemic species of snails, total 243 spiders (14 endemic), 37 species of locust (5 Balkan endemic species), 15 dragonfly species, 99 species of butterflies (Erebia aethiops and Minois dryas, located just Ossogovo) 203 insect species - Carbid. Ossogovo is characterized by communication between

people and nature, and biodiversity and human heritage preserved in natural landscapes, which contributes to the formation of specific areas.

At Osogovo six types of area has been defined, the most characteristic of which is the mountain rural area of Osogovo.

Besides the Osogovo Mountains, the following natural values have been identified and proposed in the East planning region:

- The Lower Zletovica site, which covers the lower part of the Zletovska River, from the Troyanci to Tziganchi, the surrounding rice fields and the lower parts of Osogovo Mountain. The place is important because of the species of birds (this is the only mixed colony of the night, the gray and the little heron and the eastern imperial eagles). It covers a large part of the important ornithological site, the Zelovitsa River basin. In addition, the otters meet as well as some important dragonflies.
- Ovche Pole, the region covers the most important holomorphic (salt) soils in Macedonia, where specific halophytic plants with significant botanical value have developed. There is a danger that it will become arable land.
- Kukuljeto is located southwest of the village of Novy Estenik (Delchevo area) and has a botanical and geo-morphological value. The most important is the presence of erosive geomorphological forms - soil pyramids located on two erosive slopes in a black pine forest. Part of the area is designed for tourist visits. The forms for relief of the denudation - the soil pyramids are made of pliocene sediments, mostly pliocene sands. The main prerequisite for their formation are limestone sludge, which protect the sediment from intense erosion.
- The Bregalnitza lower region is a natural monument and has a great biodiversity, geomorphological and paleontological value. The great geomorphological value is due to the presence of the Bregalnitsa fossil bed and meanders. There are also interesting bird and invertebrate species. The area is particularly important for bird protection. It is identified as an area of Emerald (Bregalnitsa). This area overlaps with other important areas such as Ovche Pole, an important ornithological area (Topolka-Babuna-Bregalnica) and the important vegetation area Krivolak (Orlovo Brdo-Solen Dol-Serta).
- Maleshevski Mountains are an important water management area that covers many areas with high natural dendrological, geomorphological and vegetative values such as Lake Berovo, Temniot Andak, Murite, Judah Meadows, Machhevo and Tsnik.

2.1.4. Climate

The Eastern region characterizes with temperate continental climate and some influence of the Mediterranean climate. The average annual temperature is about 12.9 degrees Celsius. The highest temperatures are measuerd in August, and the lowest in January. The wind blows all year round.

2.1.5. Water resources

The main sources of drinking water in the East planning region are underground water, surface water and a combination of the same. Underground water supplies the cities of Shtip (after pre-treatment), Kochani, Probhtip and Delchevo. Surface water supplies Delchevo and Vinitsa after pre-treatment.

Bregalnitsa River, the dominant water source in the region, has two water basins - Kalimanci and Lake Kochani. The East planning region does not have larger water basins and future water reserves will be provided through the planned water reservoirs along Bregalnitsa and other rivers such as Zletovitsa. The availability of thermal waters in Istibania and Kehovitsa is a favorable prerequisite for the development of SPA tourism given the possibility of their use as an energy source for heating.

Water supply systems in rural areas are mainly fed by spring and underground water. In the Eastern region there are 4 big dams: Gradce, Kalimanci, Mairyovitsa and Ratevo-Berovo. In the pool of the Bregalnitsa river there are other smaller water reservoirs, such as Petrashevets. Of particular importance to the region is the Kletzevo dam-lake, with a total volume of 23 500 000 m3 of water, which is mainly used for water supply. Water supply in the municipalities located in the East planning region is an obligation of local public utilities. The population, which has drinking water systems, ranges from 90% in Stip to 100% in Vinnitsa, while in rural areas the same indicator ranges from 10% to 80%. There are separate water supply systems in rural areas. The total length of the water supply network in the East planning region is 384 km and mainly covers the urban centers of the municipalities. In the summer there is a lack of drinking water in this area. This problem is a consequence of: high average per capita consumption, water loss in supply systems of more than 50% due to their limitation and inadequate maintenance, insufficient volume of tanks, treatment plants and other facilities. The problem of providing sufficient quantities of drinking water in this region can be solved by making better use of the ponds, located in the area as well as by reconstructing and rehabilitating existing water supply systems and reservoirs, thereby reducing the technical losses of water. With the launch of the water supply system Zletovitsa will be solved the problem with the water supply of the municipalities Probhishp, Shtip and Karbintsi.

The data on the quality of the water flows are obtained from the National Hydrometeorological Service. In the East planning region, there are two defined monitoring stations on the Bregalnitsa River, in Balvan and Ubogo. Indicators for organoleptic, mineralization, oxygen and acidic indicators, as well as eutrophication determinants, hazardous and harmful substances, are constantly observed.

2.1.6. Water infrastructure

Municipal waste water is discharged through the 250-kilometer waste water disposal system.

The collector and the urban network are mainly located in the urban centers of the municipalities. Population in urban settlements vary from 80% to 100%, while in rural settlements it ranges from 0% (septic tanks) to 80%. Parts of rural settlements lack suitable systems or septic tanks for waste water. In general, wastewater systems are in a relatively poor state, as the systems are characterized by leakage of part of the water during transportation, which increases the risk of soil and groundwater contamination.

The persentage of the population with waste water treatment plants in the Eastern region is 7.7% (12.7% is the level for the Republic of Macedonia). There is only one waste water treatment plant located in Berovo with a capacity of 14 000 ERU.

According to the study on improving the environment in the Bregalnitsa river basin, the construction of waste water treatment plants in Shtip, Kochani and Orizari, Vinitsa, Macedonian Kamenitsa, Pehchevo, Delchevo, Zrnovitsi, Karbintsi, Lozovo and Cheshinovo is planned. The water in the Bregalnitsa River is of second class quality.

Two sites of industrial pollutants have been identified in the East planning region. The main potential industrial pollutants for water are: zinc and lead mines in Kamenitsa and Probishyp.

The current state of the irrigation system shows poor technical condition of the facilities, stations and equipment, high water losses, low efficiency, insufficient capacity to change the flow through the channels, lack of regulation of the flow in the supply structure channels and pipelines, etc. The state of the systems located in the East planning region is similar. According to the Ministry of Environment and Physical Planning, the reasons for the poor state of the systems are: insufficient channel maintenance, poor quality of the original installation, incomplete design according to the project, inappropriate design solutions, low quality irrigation equipment, large number of water users, small plots, poor financial status of water management utilities and emigration from the rural regions.

The following irrigation systems are located in the East planning region:

- The Upper Bregalnica Region, the Bregalnitsa, Grazska, Groundwaters, covers an area of 1.334 ha and has a water quantity of 7.258.000 m3.
- The middle and lower areas of Bregalnitsa, the rivers of Bregalnitsa, Zletkovska, Lakovitsa and Mavrovitsa have an area of 25,758 ha and have a total water capacity of 235,086,000 m3.

2.1.7 Minerals

There are significant mineral resources in the region, mainly lead-zinc ores in Zletovo, Dobrevo and Kamenitsa (with an annual output of 1 million tons). A production infrastructure for the extraction and treatment of lead-titanium deposits in the Central Osogovo massif was built. Gold has also been discovered around Delchevo and alluvial gold in the Bregalnitsa River.

Non-metallic deposits are also extracted in this region, of which the most common are asbestos, kaolin clay, bituminous shale, opium tufts. In the Maleshev region, up to 10,000 t / year lignite coals are produced. The Eastern region is rich in coal deposits - in the Delchevo-Pehchevo area there are about 24 million tonnes of coal deposits. There is also coal in the area of Probhishp and in the region of Macedonian Kamenitsa.

2.1.8 Soils and air

Typical of the region are delluvial soils, large hilly areas, semi-mountainous and mountainous relief. There are also brown forest soils in the forest massifs, alluvial and delluvial soils near the rivers.

In the higher parts of the mountain massifs there are mountain-meadow soils with rich pastures.

The reasons for soil degradation in the region are:

- Open mines and waste ore sludge in large areas;
- Inappropriate treatment on agricultural land, cultivation of crops with intensive fertilizers and pesticides;
- Increased and uncontrolled use of pesticides;
- Destruction of soil layers, erosion and deforestation;
- Changes in the physical-chemical soil structure caused by existing industrial capacities, as well as sedimentation of particles of contaminated air;
- Use of polluted water for irrigation;
- Inappropriate waste and waste water management, etc.

Air quality in the East planning region is relatively good, with the exception of some urban settlements where the concentration of pollutants, mostly PM particles, is increasing during the winter.

The lack of large industrial plants contributes significantly to achieving high quality of the air. The Air Quality Monitoring Station is located in Kochani.

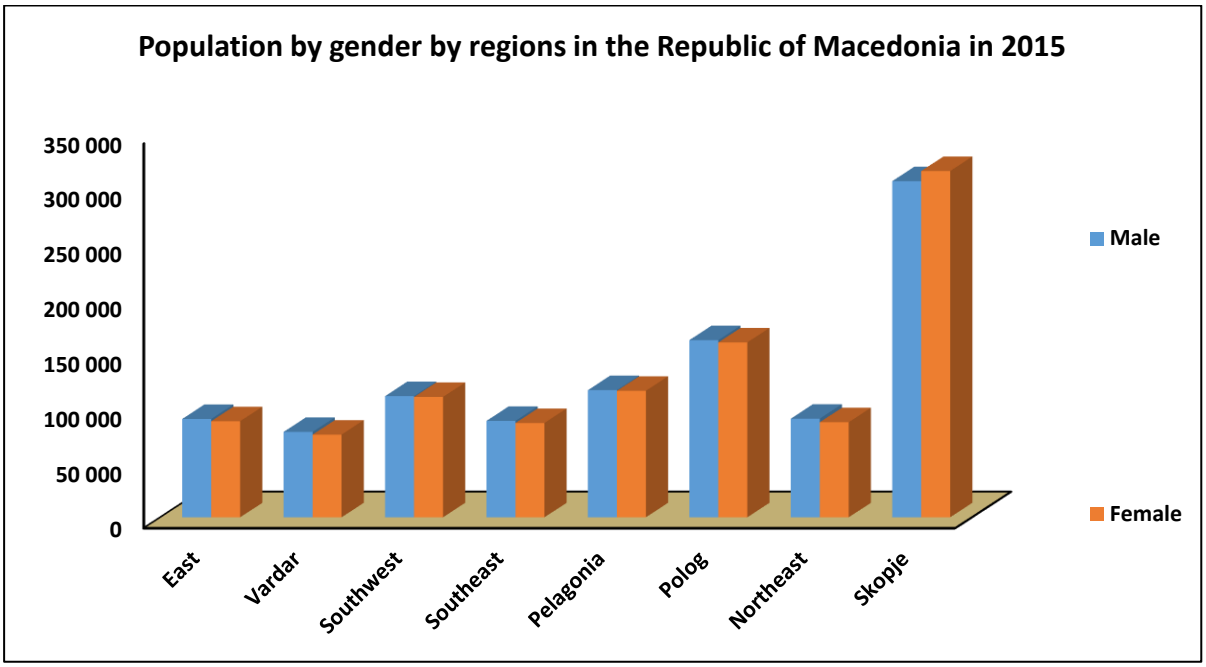
2.1.9. Demographic characteristics

According to the data of the State Institute for Statistics of the Republic of Macedonia, the population of the region by 2016 is 176 877 people or 8.54% of all residents and it is ranked fifth by this indicator. A preferred place to live is the Skopje region with a population of 620,913 people, followed by the Poloshki region - 15,46% and Pelagoninski - 11,14%.

The regions around the Skopje district provide favorable conditions for achieving a good standard of living, thus making the region more attractive for permanent establishment.

The following chart presents information on the number and relative share of the population by gender in the regions of the Republic of Macedonia in 2015.

Chart 17.



Source: SIS

Population by regions is evenly distributed between the two genders and in some regions this indicator is almost identical. In the East planning region, the relative share of men is 52.27%, while for women it is 47.73%. Only in the Skopje region there is a change in this rating - women prevail over men.

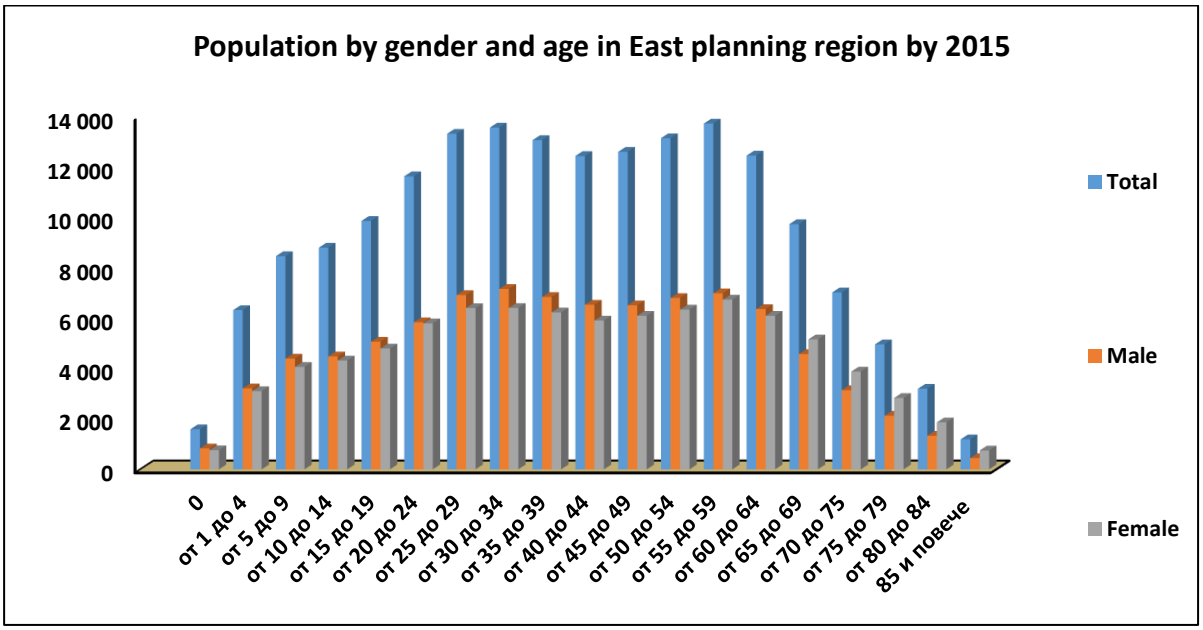
In the age structure of the population in the region from age 0 to 64, the male sex predominates. People with the highest relative share are between 55 and 59 years of age, followed by representatives of the 30-34 and 25-29 age groups.

There is a favorable age structure in the East planning region, given that the relative share of the aging population is only 3.63% (the 60-85 age group and more), the working population (population aged 20-64) has the impressive 58.44%, and the growing population is 19.78% of the total for the region.

The share of the population with working age status is high in almost all areas within the territorial scope of the East planning region, which is a good indicator of the economic activity of the population and is also essential for reproduction.

The territory of the region has a favorable age structure - the share of old people is low and maternity contingents are high. In this regard, there are favorable prerequisites for achieving sustainable economic growth and long-term development, which will support the positive trend towards the working population.

Chart 18 contains data on the age structure in the region.



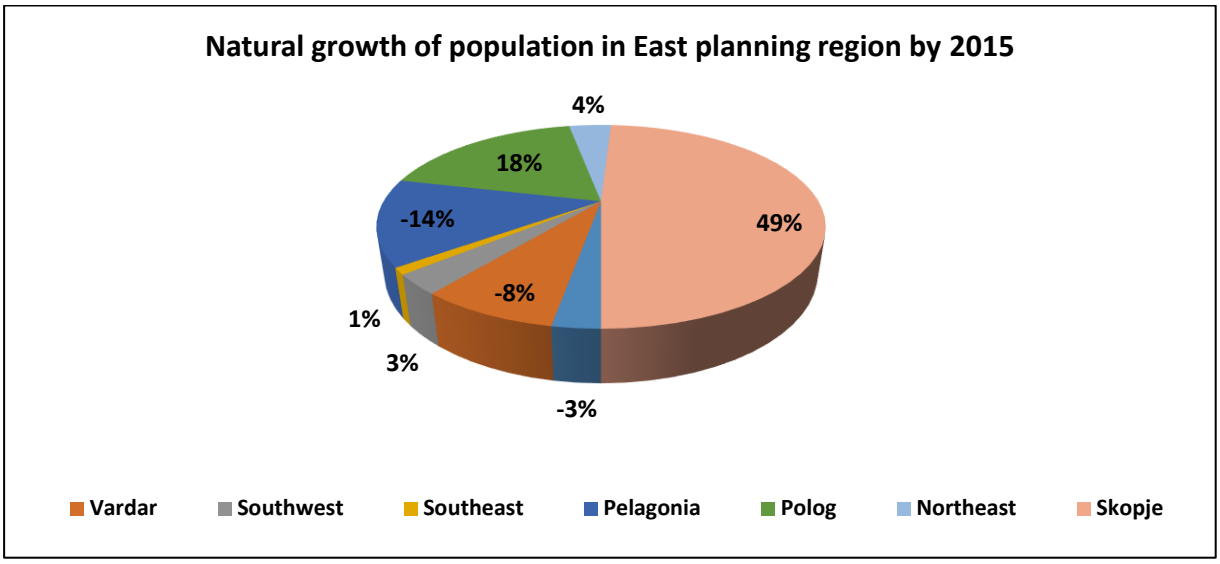
Source: SIS

Despite the good demographics of the age structure, there is a negative natural growth in the East planning region. The highest mortality rate is in the Skopje region - 29.26%, followed by Pelagoninski - 14.25% and Poloshki - 11.72%. The East planning region characterizes by a low mortality rate of 8.68% and ranks one of the last places according to this indicator.

At national level the leader in terms of natural growth is the Skopje region with a share of approximately 96.51%, followed by Poloshki - 36.15%, North-East - 7.56%, Southwest - 6.04%, and Southeast - 2.05 % regions.

Considering the favorable data on age structure and natural growth of the population in the East planning region, the prospects for economic development and improvement of living standards can be defined as realistic and fully achievable.

Chart 19.

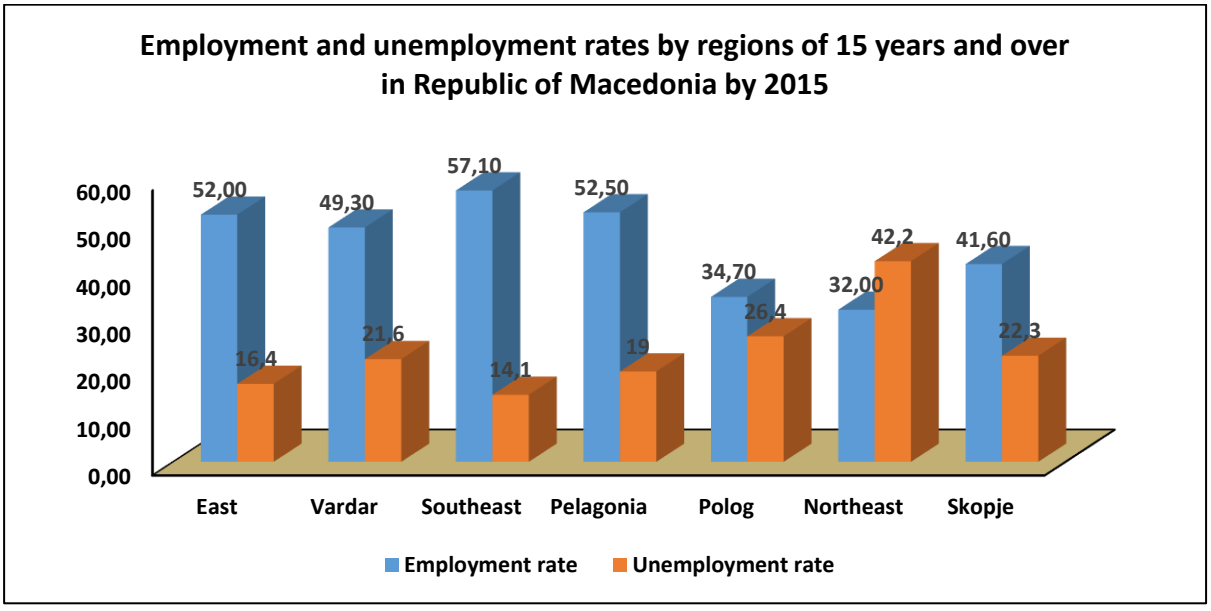


Source: SIS

2.1.10. Economic activity of the population

According to data from the State Statistical Institute for the rates of employment and unemployment of the population by regions in the Republic of Macedonia, for East planning region the rates are comparatively favorable compared to the situation in the other regions.

Chart 20.

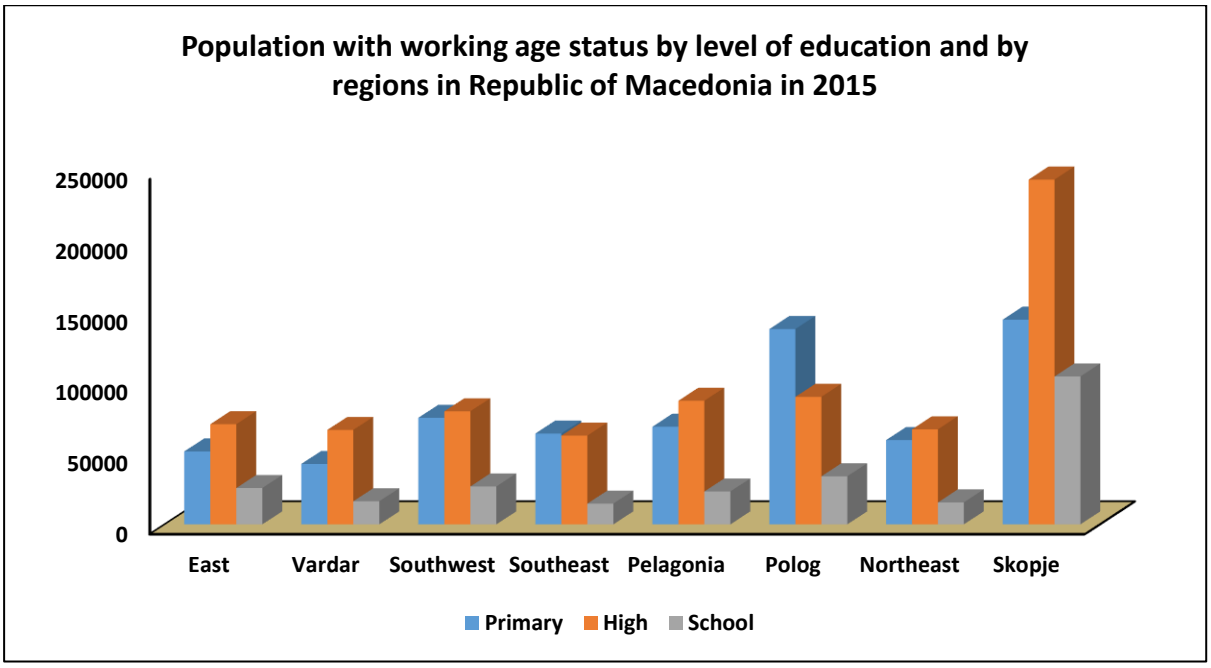


Source: SIS

The employment rate in the region, according to the above chart, is average compared to other regions, but the unemployment rate in the East planning region can be estimated as low, with a relative share of 16.4% compared to the average for the country - 24.38%.

There is a positive trend with respect to the given indicators, compared to the previous 2015, as employment increases from 51.6% to 52.0% and the unemployment decreases from 24.5% to 21.6%.

Chart 21 shows information for the population with working age status according to the degree of education by regions.



Source: SIS

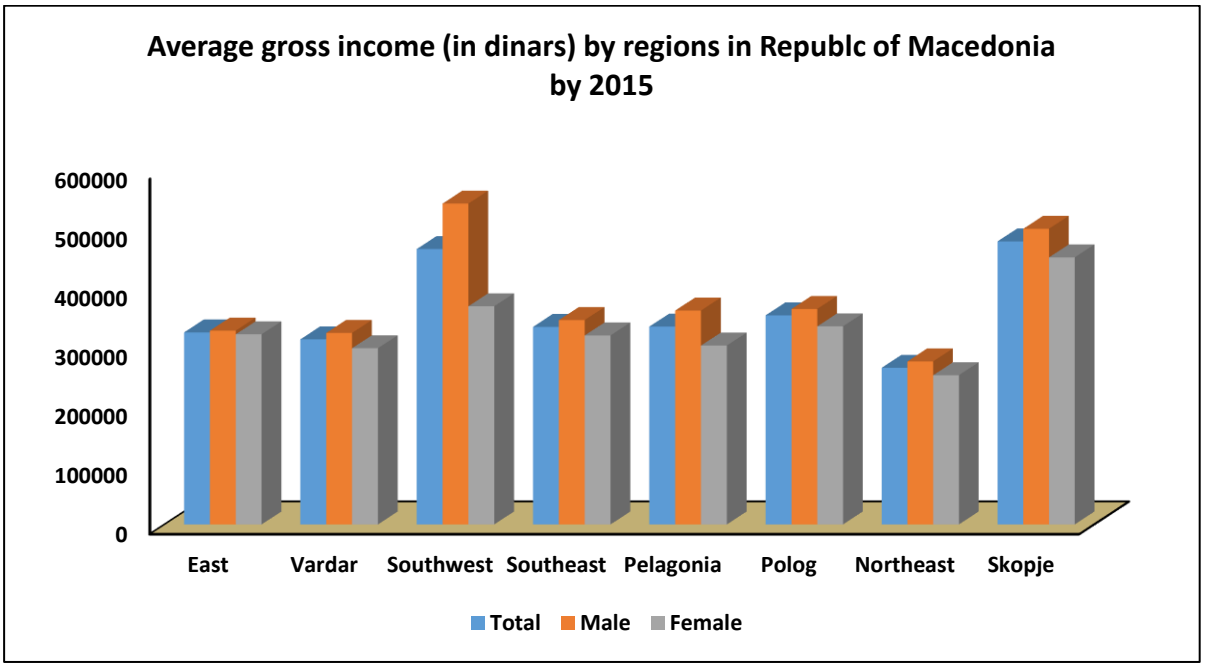
By level of education in relative share the population with working age status in the East planning region is as follows: higher education - 3.98%, secondary education - 10.97%, basic education - 7.99%. For comparison, the national average indicators are as follows: university graduates - 5,05% graduating from secondary education - 14,89% graduating from primary education - 12,50%.

The analysis of these data shows that the proportion of university graduates in the East planning region is relatively high and the proportion of people with primary education is relatively low compared to the average for the country. The presence of a large number of young and educated people is a good prerequisite for the economic development of the region due to the possibility of identifying and realizing future ideas that will contribute to the improvement of the common good and the fact that human potential is the main driver for achieving growth and sustainable development.

The information on the income of the population in the region is a welfare criterion of the region of residence, since the wage level affects the number, employment and age structure of the population, migration, productivity, living standards, etc.

According to the figures in the following chart, the gross salary of 324,216 dinars in the East planning region is below the country average of 358,083 dinars and by this indicator the region ranks fourth. The implementation of policies and the accomplishment of certain measures to raise the level of the gross wages in the region will contribute to preserving the favorable trends in economic activity and the age structure of the population. There are many prerequisites for improving the socio-economic profile of the region that should be used.

Chart 22.



Source: SIS

There is some imbalance in men and women's remuneration in the East planning region, but it should be noted that the difference is small. A significant difference in gross remuneration is seen only in the Southwest and the Skopje region, while in the other regions the values are close.

2.1.11. Housing sector

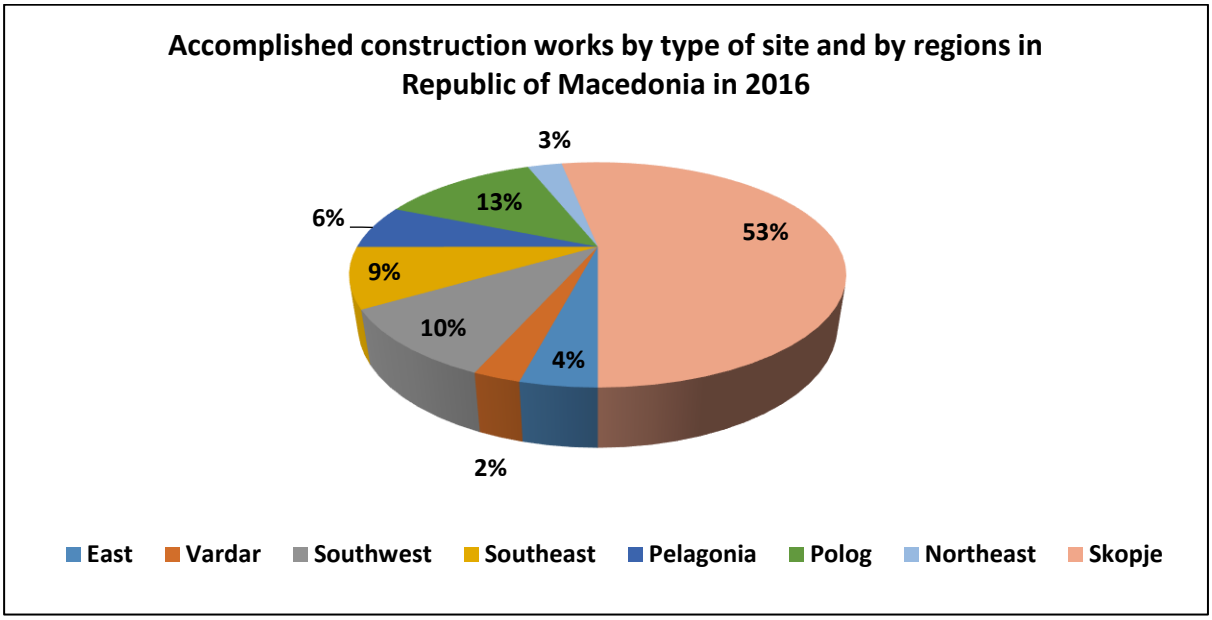
According to State Statistical Institute data, the total number of construction works per type in the East planning region is: residential buildings - 628 322 (thousand dinars); non-residential buildings - 449,125 (thousand dinars). Due to the concentration of the population in the

Skopje region, it is the leader in this indicator with a relative share of 53% of residential buildings and 47.27% of non-residential buildings.

Compared to the other regions, the East planning region ranks one of the last places on the above indicator, so we can conclude that the construction of residential and non-residential buildings is at a very low level, the existing buildings are probably heavily depreciated, needing renewing and implementing energy efficiency measures to improve housing comfort and quality of life in them. Generally there has been no uplift in construction activities in the region.

The data confirming the above conclusions are presented in the following chart:

Chart 23.



Source: SIS

2.1.12. Healthcare

The population of the region with provision of health services is around 99%. The availability of primary and secondary health care services is at an average national level, while higher levels of healthcare are less accessible. Hospital care is organized through a network of hospitals in the urban centers.

2.1.13. Education

The level of education in the East planning region of Macedonia is average. In the city of Shtip, the administrative center of the East planning region, are located most of the schools in the region as follows:

- Primary schools - "Vancho Prce" Primary School; "Tosho Arsov" Primary School with Chardaklia Satellite School; Primary School "Dimitar Vlahov" and "Gotse Delchev" with a branch in Macedonia
- Secondary schools - "Slavcho Stoimenski" Secondary School, Jane Sandanski - Specialized School for Acquisition of Medical Education; "Kolle Nehtenin" Secondary School - a specialized school for electricians, chefs, catering and information technologies; "Dimitar Mirashiev" Secondary School - Textile School;
- Higher educational institution - Gotse Delchev University.

The presence of a university attracts young people in the region, which explains the favorable age structure and good indicators for the employment and unemployment.

In Makedonska Kamenitsa municipality the schools are: Municipal general school “St. Cyril and Methodius ", secondary school “Mille Janevski Tsingar” and others.

The educational structure in the municipality of Kochani is represented by the primary schools "St. Cyril and Methodius "," Nikola Karev "," Malina Popivanova "," Rade Kratovche "," Crte Misirkov " and the secondary schools: “Lyubcho Santov” and “Gosha Vikentiev”.

In the Probiti Shtip municipality there are the primary schools "Bratya Miladinovi" and "Nikola Karev".

Four schools are located in the municipality of Delchevo – municipal general schools "Vancho Prke", "St. Kliment Ohridski "," Veseli Cvetovi "and secondary school " M. M. Brisco ".

The schools in Cheshinovo-Obleshevo municipality are only two – municipal general schools "Strasho Pinsur" and "St. Kliment Ohridski".

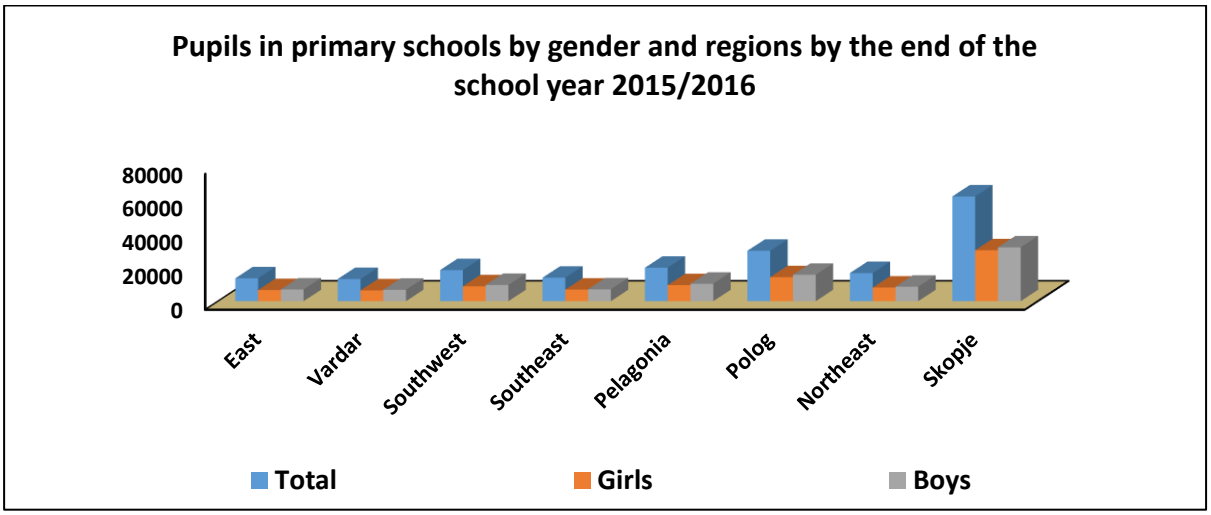
One central primary school is located in the municipality of Zurnovtsi and one municipal general school "Strasho Pintsur" is located in the municipality of Karbintzi.

In the municipality of Vinitsa there are two primary schools – “Slavcho Stoimenski” and “Gotse Delchev”. Similar is the situation in the municipality of Pehchevo, where there are also two schools – “Vanyo Kitanov” primary school and “Asko Ruskovski” high school.

The Municipality of Berovo is the last municipality in the East planning region, where three schools are located – “Dedo Ilya Maleshevski” primary school, “Nikola Petrov – Russinski” primary school and “Ratso Ruskovski” secondary school.

The total number of pupils in primary schools in the East planning region is 13,449.

Chart 24.

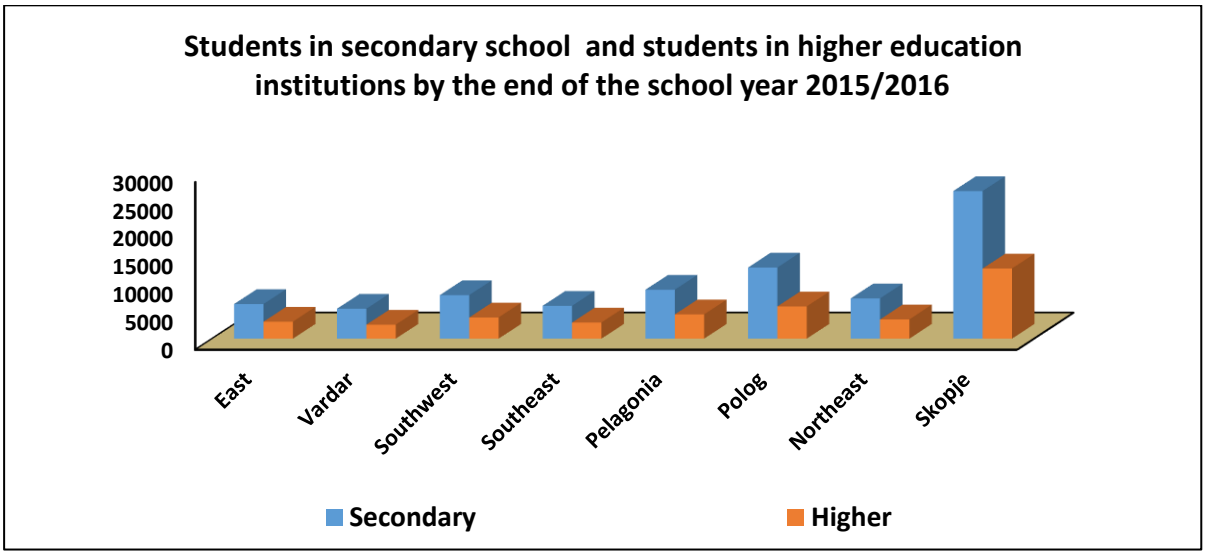


Source: SIS

There is a lag behind by this indicator in the East planning region, since the national average indicator is 23 249 students.

The situation is similar also for students in secondary schools and students in higher education institutions in the region. This can be seen in the following chart:

Chart 25.



Source: SIS

There is a significant lag behind in the two above-mentioned indicators compared to the data at national level.

Local regional authorities have to pay particular attention to education as its functions are extremely important in terms of the quantity and quality of human potential that is a key to achieving sustainable growth and development. In this regard, a commitment by regional authorities should be to formulate specific policies, create and implement objective measures for their implementation in order to achieve a higher level and a higher quality of education in the region, which will be a prerequisite for a future development. In conclusion, we note that the quality of human capital is a key to achieving development in every respect.

Some of the main problems of the educational system, both at national and regional level, are the training of specialists in line with the needs of the business and the provision of the necessary means for conducting training in normal conditions, including the availability and maintenance of the relevant material- technical base.

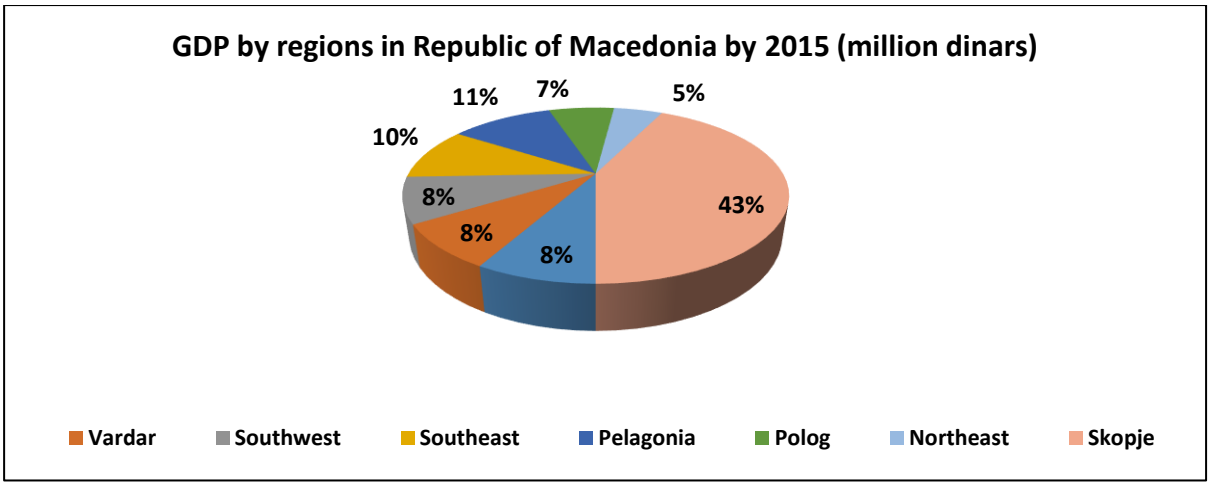
An advantageous prerequisite for the achievement of the scientific and practical-applied potential for the development of the region as a whole is the presence of higher education institutions. In this regard, it should be noted that there is a university in the East planning region.

2.1.14 Economy

The East planning region has a relative share of 8% GDP compared to the average for the Republic of Macedonia in 2015 - 12.51%. It is ranked 5th out of all 8 planning regions. The most important sectors of the economy are agriculture, food, footwear, clothing industry and construction.

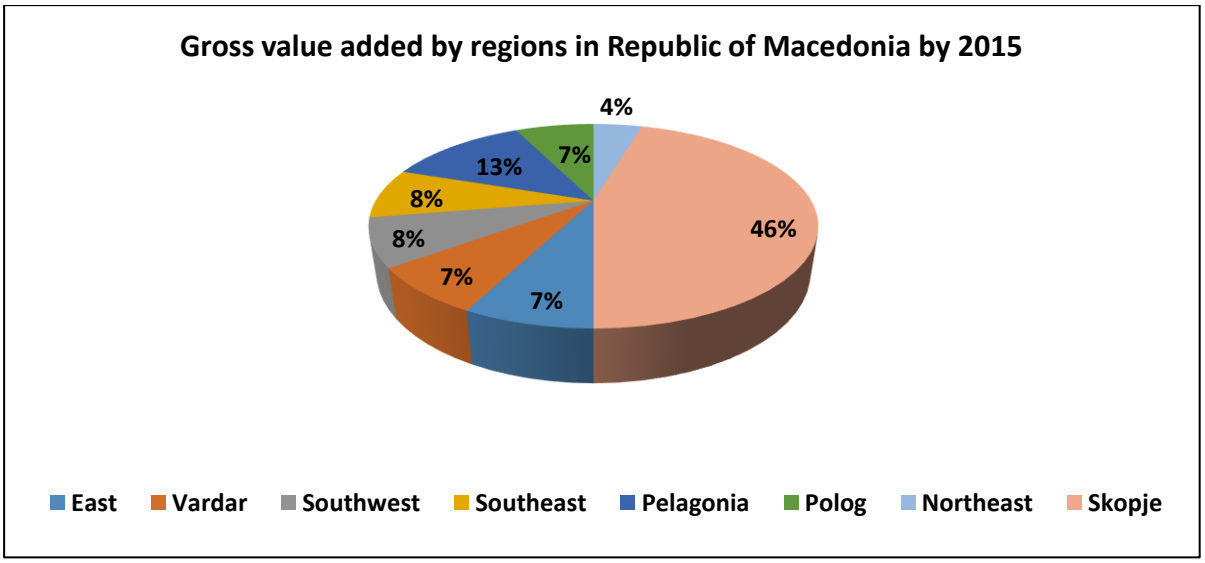
The region has many agricultural areas and an excellent climate for growing crops.

Chart 26.



Source: SIS

Chart 27.

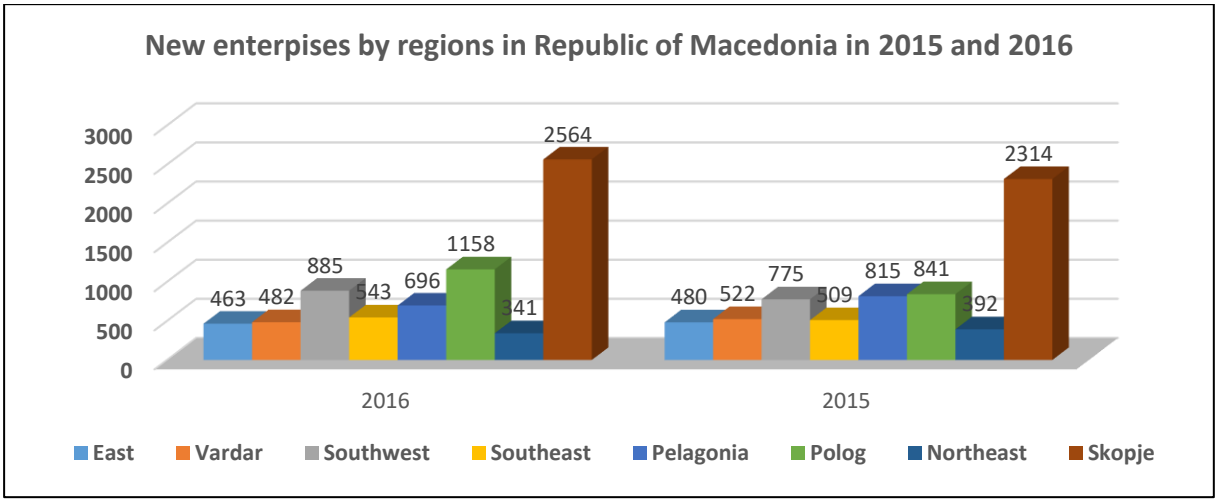


Source: SIS

The Gross value added in the East planning region formed 7.47% compared to the other regions of the Republic of Macedonia. By this indicator the region ranks fifth and lags behind the average for the country - 12.50%, with more than 5%.

Working enterprises are essential for the economic development as they contribute to improving the rates of employment, unemployment and income. The indicators of economic activity can be considered good for the region (see 2.1.9 Economic Activity of the Population).

Chart 28.



Source: SIS

According to the abovementioned statistics, the number of start-ups in 2016 is decreasing compared to the previous year. There is a significant lag behind this indicator compared to the national average, but the region ranks fifth in among all regions.

Micro, small and medium-sized enterprises have an important impact on the economic development because they are a source of added value and provide a significant share of the jobs. A total of 5,218 enterprises operate on the territory of the East planning region in 2016, contributing to employment at national level of 8.04%. It should be noted that of the same 4,559 are micro, 457 are small, 179 are medium and 23 are large. The region ranks fourth in terms of the number of large enterprises compared to the rest of the regions.

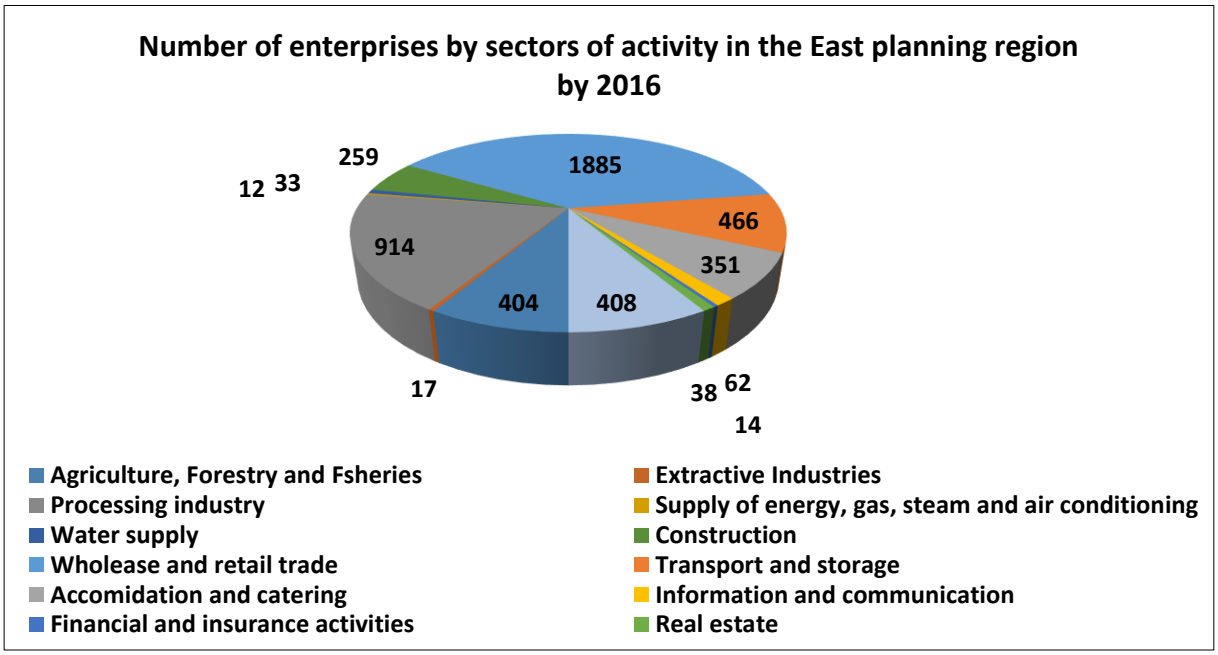
Table 3.

Region/Employees	from 1 to 9	from 10 to 49	from 50 to 249	250+
Vardarski	4536	340	105	14
Eastern	4559	457	179	23
Southwest	6117	393	108	9
Southeast	4741	480	109	11
Pelagoninski	6772	511	130	25
Poloshki	7122	382	96	8
Northeast	3393	296	87	4
Skopje	19485	2282	549	139
Total:	**56 725**	**5 141**	**1 363**	**233**

Source: SIS

SMEs influence the structure of the market and expand market relations as a result of changing the quantity of market players by increasing the qualification and the degree of involvement of more and more layers of the population towards the system of entrepreneurship and business activity. The importance of SMEs is also that in pursuing a fierce struggle for survival they are forced to constantly develop and adapt to the current market conditions at the cost of innovation.

Chart 29.



Source: SIS

A large part of the enterprises - 1,885, are concentrated in the services sector - Wholesale and Retail, followed by Processing Industry - 914 and Transport and Storage - 466.

There are several agro-industrial plants, livestock farms, slaughterhouses, distilleries, etc. in the region. Although wholesale and retail are the most developed in the region, the clothing, woodworking, footwear and agriculture industries are also well-performing sectors, in terms of number of enterprises and production.

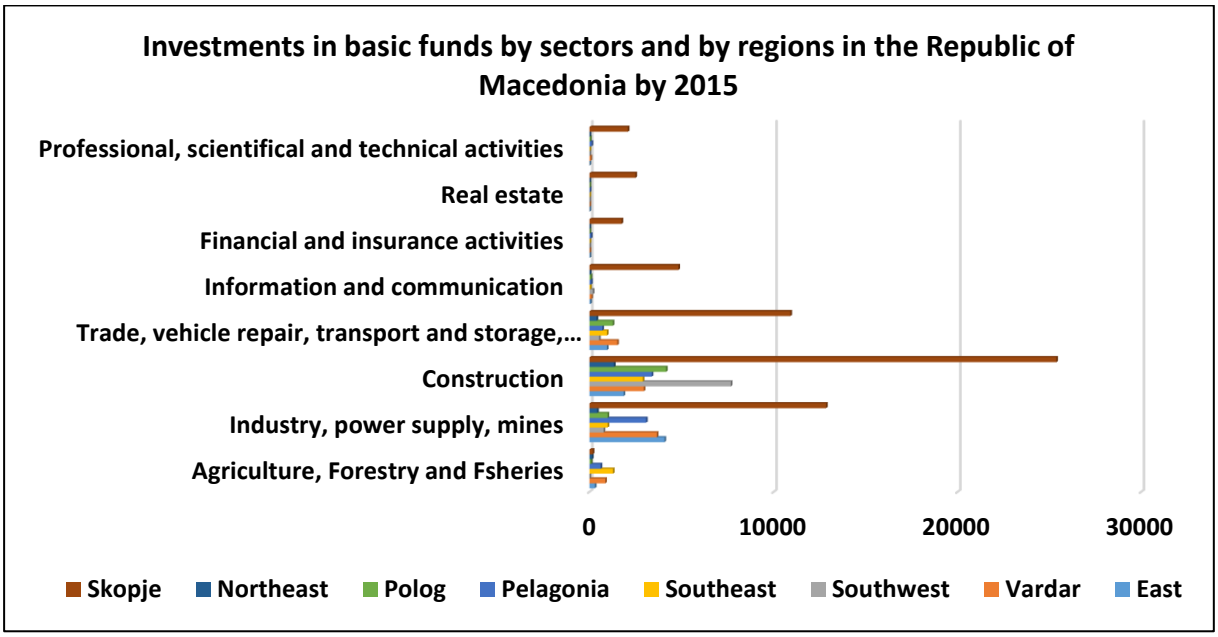
An important growth criterion is the investment made for the purchase of tangible fixed assets by enterprises in the region. The cost of acquiring tangible fixed assets in the East planning region in 2015 amounts to 9,142 (million dinars) or 18.77% of total invested funds.

The analysis of the data shows that significant resources for business development were invested in the East planning region by 2015. This will inevitably contribute to the creation of favorable conditions for employment, income increase, etc. By this indicator, the region is at second place.

The Shtip municipality is a well-developed area where all sectors of the economy are represented. The region has a leading role both in the manufacturing industry and in the sectors of “Retail and wholesale”, “Transport and storage”, “Accommodation and catering” and “Professional, scientific and technical activities”.

The concentration of economic activity in the Shtip municipality is logical given its place and importance. It should be noted that, given the structure of settlements, characterized by a large number of villages, the town of Shtip is a center of attraction for the population due to its good economic development and the opportunities it provides for income insurance and better quality of life.

Chart 30.



Source: SIS

The "Wholesale and retail" and "Transport and storage" sectors are well developed in the municipality of Makedonska Kamenitsa.

2.1.15. Industry

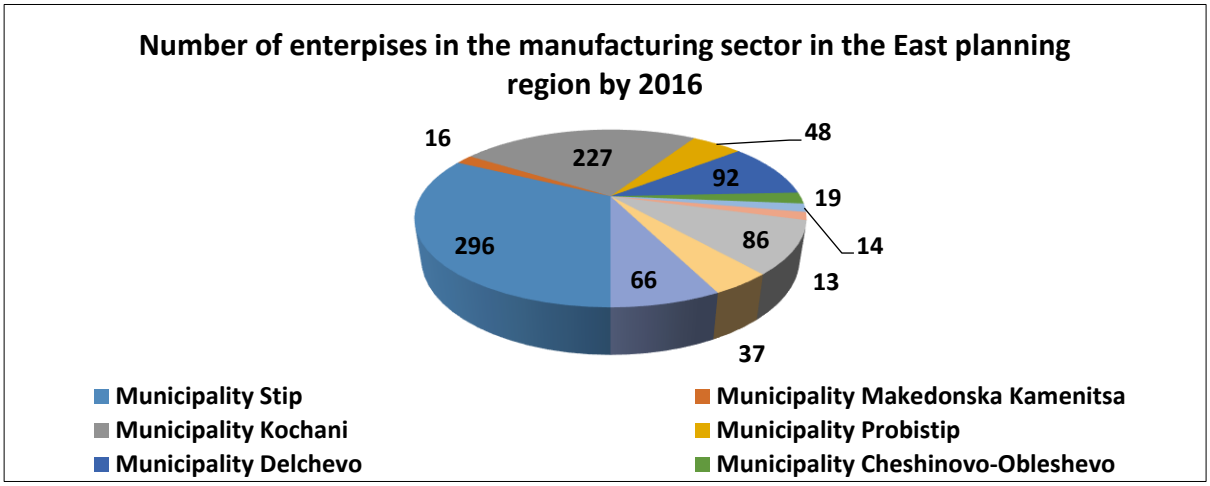
Industrial enterprises operating on the territory of the region are unevenly distributed, with many of them concentrated in the municipalities of Stip - 296 and Kochani - 227, and a smaller number in the municipalities of Delchevo - 92 and Vinnitsa - 86.

In the rest of the municipalities included in the regional territory the industry is underdeveloped.

Minerals are extracted mainly in the municipalities of Probisypt, Kochani and in smaller quantities in the municipalities of Vinnitsa and Macedonian Kamenitsa.

The following chart contains information on the number of enterprises in the manufacturing sector.

Chart 31.



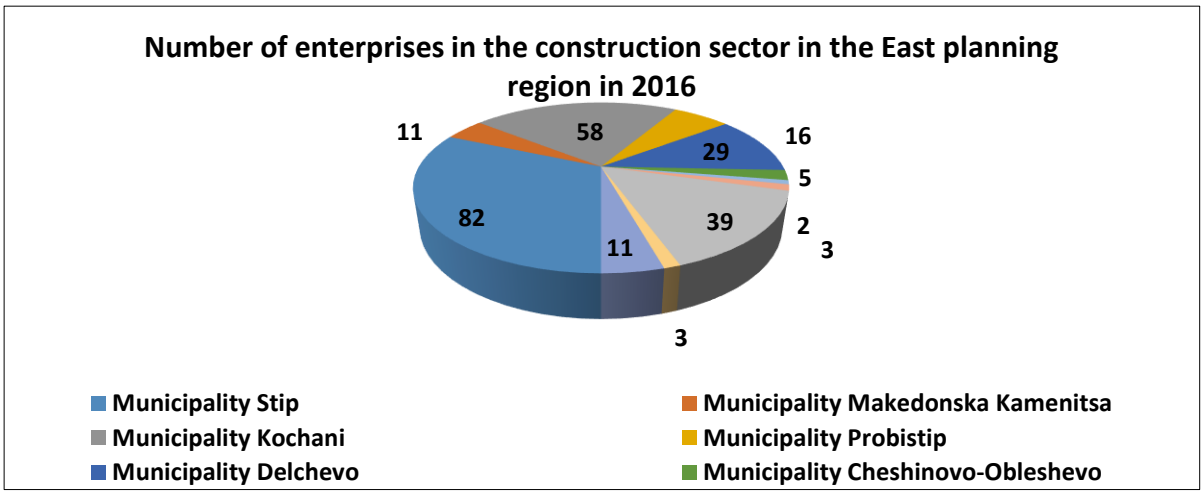
Source: SIS

2.1.16. Construction

According to data of the national statistics, the share of enterprises in the Construction sector, compared to other sectors of the economy, is high - 63%. The enterprises operating in the sector are located in all municipalities, but in the municipalities of Shtip, Kochani and Vinnitsa there is a larger number of them.

The distribution of enterprises in the Construction sector by municipalities is shown in the following chart.

Chart 32.



Source: SIS

The total number of construction enterprises in the region is 259 and according to national statistics, 2,949 million dinars were invested by 2015 in them. The sector can be described as developing and will continue to grow in the future. Obviously, the regional authorities and business representatives have been able to find the right approach to the sector's recovery and development, given the financial and economic crisis that has had a negative impact on all businesses, not just in the construction sector.

In 2016, a construction work of 4 419 336 (thousand dinars) was carried out in the East planning region of the Republic of Macedonia.

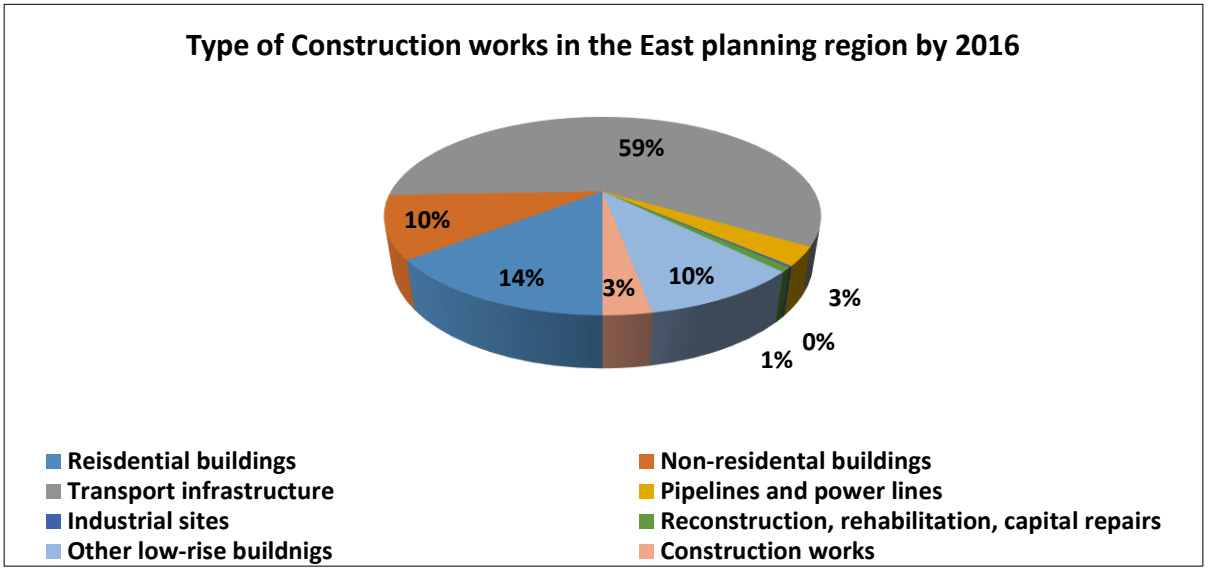
A significant amount of the above value is invested in the Transport Infrastructure sector with a share of 59% of total construction activities. Probably these are road infrastructure projects.

The share of construction works in the construction of residential buildings has a relative share of 14%, while in non-residential buildings and other low-floor buildings it is 10%. The other types of activities - pipelines and power lines, industrial sites, reconstruction, rehabilitation, capital repairs have a low relative share.

Attention should be paid to the fact that very few renovation and repair works have been done - only 0.75% and this is an indication either of the existence of a large number of new buildings (residential or non-residential) or of a huge potential for implementing energy efficiency measures and renovation because of accumulated amortization of buildings.

Figure 33 contains information on the distribution of the construction works by type of sites.

Chart 33.



Source: SIS

In conclusion, the Construction sector is well developed in the East planning region, an indicator of which is the amount of funds invested in improvements of transport infrastructure and housing and the information on the construction activities carried out by the municipalities.

2.1.17. Agriculture

Agriculture is one of the main economic sectors in the region. The current situation of agriculture shows a strong specialization of the individual regions in the production of certain crops. It should be borne in mind that in a large part of the municipalities and in the villages the "Agriculture" sector is the main livelihood for the population and the only opportunity for an income.

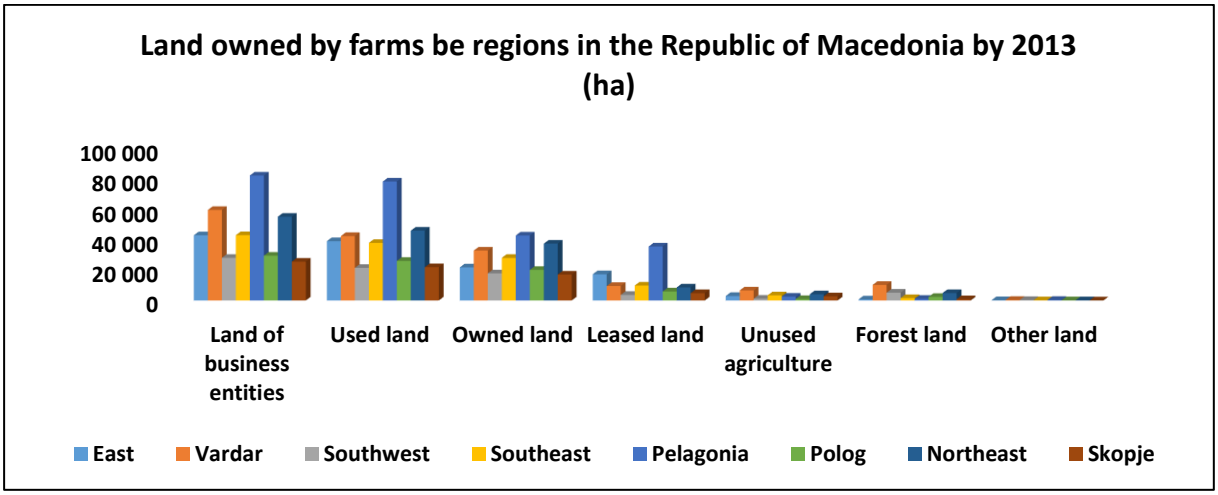
Typical of the region is the high relative share of rice and potato production which needs to be encouraged, as there are favorable prerequisites for export of these two products.

Agriculture is a traditional sector in the economy of the Republic of Macedonia and it is of crucial importance for its development. The fact is that the planning regions are already developing their agricultural potential, but the production is accomplished without the use of modern methods and the necessary technological equipment, and the main problem is the irrigation of the agricultural land. The East planning region is no exception in this respect.

In view of the above, it can be concluded that in this region the fragmentation of the districts is lower than the average in the Republic of Macedonia, but the agricultural enterprises manage relatively small areas.

The structure of agricultural land owned by farms by regions is presented in the following chart.

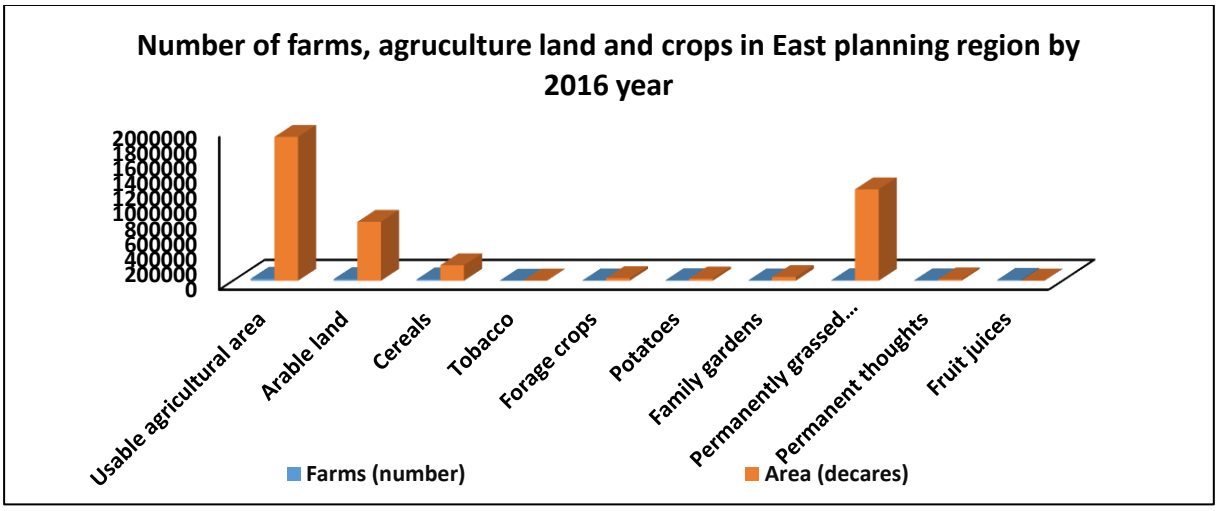
Chart 34.



Source: SIS

The production of particular grain (wheat and corn) gradually increases due to the weaker increase in production at the state level. As a result, the share of the East planning region in total state grain production increases.

Chart 35.

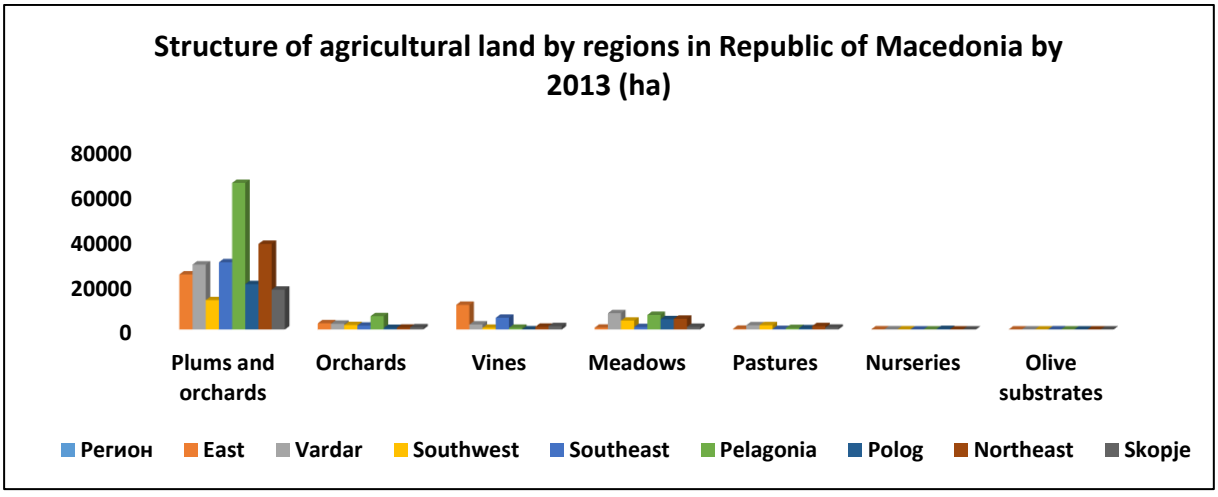


Source: SIS

The production of some garden crops (tomatoes, peppers, cucumbers, potatoes and onions) increased in 2016, compared to 2015 with 16.01% (from 91,362 tons to 105,986 tons). The positive trend of total crop production at state level is favorable too.

The East planning region has the highest relative share of forest land and unused agricultural land compared to their total share at national level. The presence of many forest lands suggests that there is a huge potential for biomass energy production.

Chart 36.



The source of information is SIS.

The structure of agricultural land by regions shows that vine-growing is widespread in the East planning region, with the area of meadows and pastures being the largest in comparison with other regions.

The Eastern region includes the plains of Kochani and Stip and the surrounding municipalities, as well as the mountain areas of Maleš and Pijanec. Given the specificity of the area, the size of the pastures is larger than the arable land.

The total amount of agricultural lands is 177,633 ha, of which 43.26% or 76,818 ha are arable land and 56.74% or 100,784 ha are pastures.

In this region dominating are arable lands with plots and gardens 63,621 ha, orchards 3710 ha, vineyards 1562 ha and meadows 7925 ha.

The region characterizes with a large size of agricultural land and an excellent climate for growing crops. In this regard, it is important to be mentioned that there are good conditions for rice production. The production of grain (especially rice), wheat and corn is predominant. Rice fields in the region produce 95% of the total volume in the country. Early crops, tobacco and potatoes are also grown in the region. It is the largest potato producer in the country, and there are favorable opportunities for livestock farming, especially for sheep and goat farming.

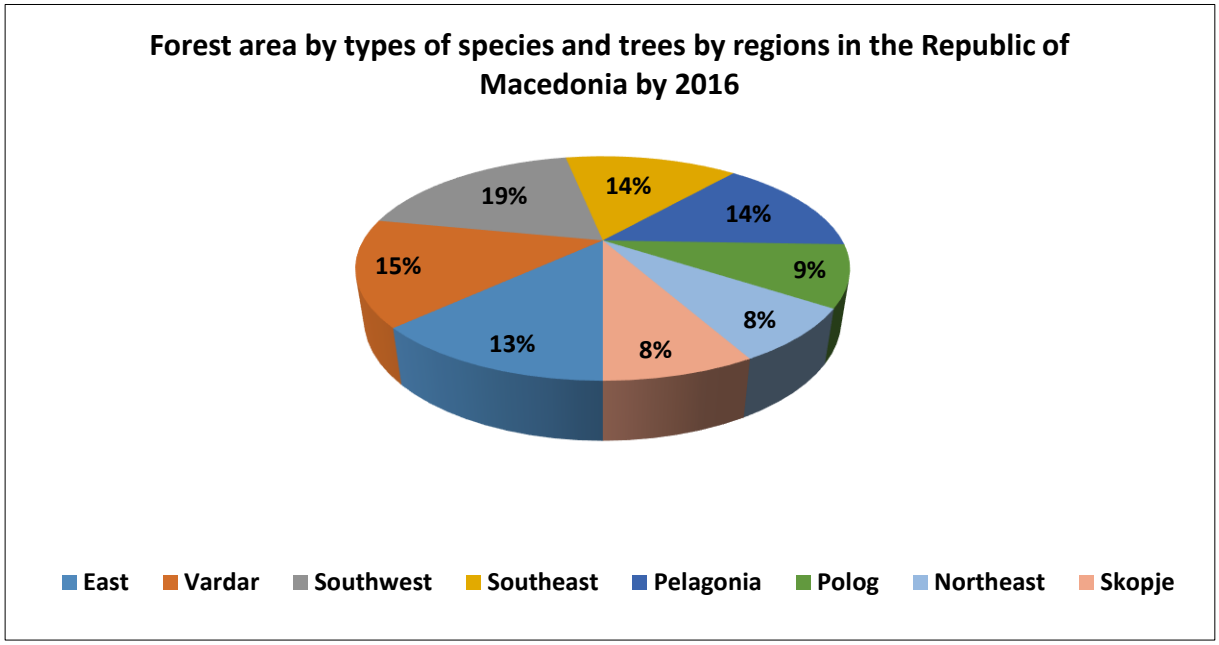
The presence of mineral springs creates very good opportunities for greenhouse production.

Livestock farming in the East planning region is mainly represented by several species of domestic animals (sheep, goats and pigs). The presence of cattle in Bordo areas has a special significance and potential for development (Berovo-Delchevo). It is also important to emphasize that sheep farming is a traditional production that is preserved in the region and recognized as a separate product (Ovchepolska sheep, Berovo cheese), which has recently been supplemented with goat production. For the Eastern region, it is important that compared to the total number of livestock for the separate species in the Republic of Macedonia, around 26.00% of the pigs are raised in this region.

2.1.18. Forestry

Forestry on the territory of the East planning region is very well developed because the regional territory covers a large forest fund and it ranks second, compared to the overall national level indicator. 38% of the total area of the region is woodland, which is 15% of the country's forest fund.

Chart 37.



Source: SIS

The economic significance of both wood as a traditional resource in the East planning region and the preserved soils, water and oxygen balance will increase in the future, necessitating the establishment of regimes for the integrated use of forests and their optimal reproduction.

The total forest area in the region is 152 908 decares.

2.1.19. Tourism and culture

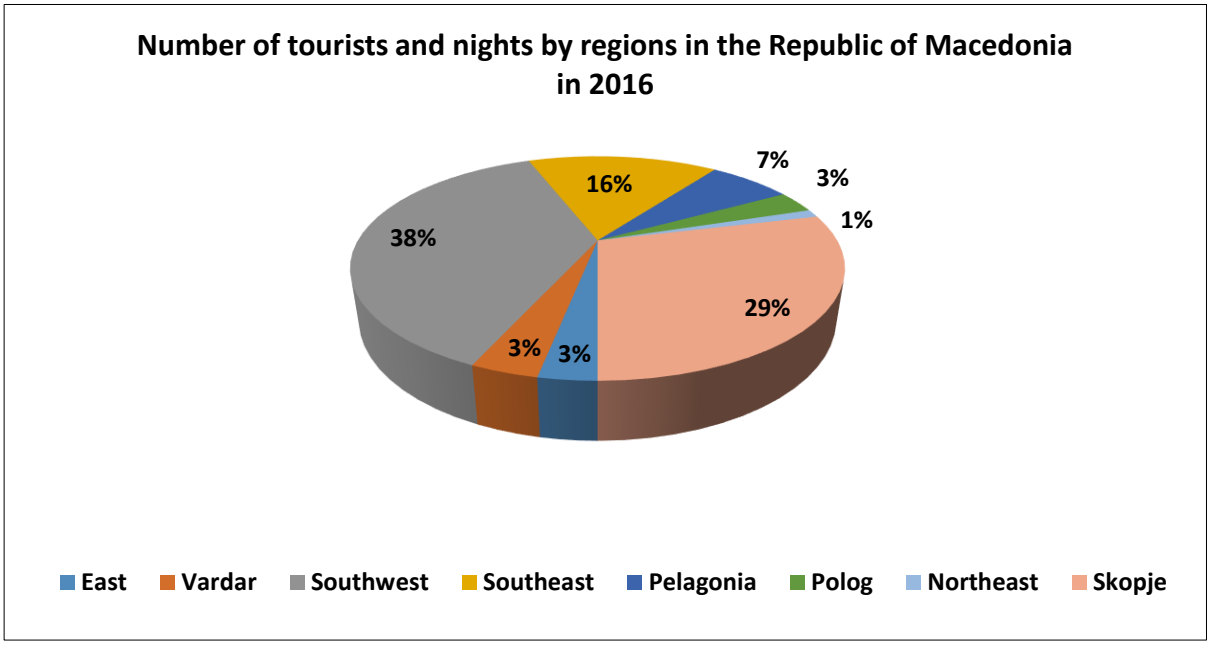
The rich cultural and historical heritage together with the presence of hot mineral springs in Vinitsa (Istibanya) and Shtip (Kesovica) create excellent opportunities for spa, eco and rural tourism development and great potential for turning it into an attractive destination for many tourist maps.

The territory is rich in natural landmarks, as the most interesting tourist sites are:

- Archaeological site "Vinko Kale" and "Bargala";
- Natural Reserves - "Goten", "Linak", "Male", "Zranska Reka", "Ulyomi" River;
- Natural landmarks - "Zvegor", "Kovska Doupka" cave, "Modyrovis", "Macevo", "Cervana Topola" and others.

The East planning region of the Republic of Macedonia has not become yet an attractive tourist destination, considering the relative 3% share, by the number of tourists and nights spent in 2016 year.

Chart 38.



Source: SIS

According to the data, the Southwestern region has the largest share - 38%, followed by Skopje - 29% and the South - East - 16%. The percentage of tourists visiting the East planning region is relatively low. In this connection, greater attention should be paid to the opportunities for promoting the area, with a view to increasing the number of visits and revenues. For this purpose, it is necessary to carefully assess the current situation of the sector, to identify the main objectives and concrete measures which implementation will contribute to improving the attractiveness of the region.

The main favorable conditions for the development of tourism on the territory of the district can be summarized as follows:

- Diverse relief, natural landmarks and rich cultural and historical heritage;
- Availability of mineral springs.

2.1.20 Short comments on the economic development of the region

The advantages of the East planning region in terms of economic development can be summarized as follows:

- Increase of the employment rate of the population;
- High economic activity of the population;
- Decrease in unemployment;
- Increased investment in the region;

- High export potential;
- Resource provision with timber;
- The intentions of the regional authorities to achieve economic development;
- Presence of minerals for construction;
- A large area of agricultural land;
- Favorable opportunities for realization of projects for the production of energy from renewable energy sources.

The wealth of the population in the East planning region increases in 2016, but it remains below the country's average. Local taxes and fees for the region are relatively low, which supports the efforts of the regional authorities to attract investment to raise people's living standards.

The analysis of the data on the development of the economy in the region shows that there is a potential for development in industry, above all in the manufacturing, agriculture and tourism sectors.

In addition to positive, there are also negative factors influencing the economic development of the region, summarized as follows:

- The existence of an insignificant number of structurally identifying enterprises;
- A large number of small and medium-sized enterprises, which poses a risk of structural instability;
- The main sectors that make the biggest contribution to the regional economy and determine its profile are services - trade, hotels and restaurants, and secondly the industry;
- The development of technological production on the territory of the region is low;
- Shortage of staff, meeting the needs of the business in the region;
- High indebtedness between the companies;
- Difficult admission to financing;
- Difficult realization of production and low purchase prices;
- Lack of investment to modernize farms, low competitiveness;
- Lack of regional markets and exchanges for the realization of the produced agricultural production;
- Fragmentation of agricultural lands, necessity of consolidation;
- Lack of risk-sharing and land-use organizations on the cooperative principle;
- Low salary levels;
- Poor state of water infrastructure and limited access to water resources for irrigation;
- Poor condition of transport infrastructure.

In view of the above, it is advisable to pursue a targeted policy in the field of education aimed at preparing highly qualified staff for business in the fields of Industry, Agriculture and

Tourism, providing investment for modernization of agricultural holdings, creating "collective forms "for the management of agricultural lands, ensuring wide publicity about the possibilities for financing under the European funds and programs. All this will contribute to the stabilization and development of the economy in the East planning region.

2.2. Assessment of energy resources - Blagoevgrad district

2.2.1. Factors influencing energy planning

The main factors that influence energy planning are:

- Natural resources of the territory;
- Climate and meteorological factors;
- Ecological status;
- Population;
- Economic entities;
- Agriculture

Blagoevgrad district is a territory rich in natural resources - mineral springs, minerals, coal, huge forest reserve, arable land, etc.

The population in the region is more than 310 (thousand people) by 2016.

The territory is under the influence of three climatic regions: the transitional continental, the transitional Mediterranean and the mountainous area, with the air temperature having sharp amplitude, which is determined by the geographical width, the atmospheric circulation and the physio-geographic features of the area - altitude, relief, vegetation, water basins and others.

Wind is one of the elements of the climate that has a direct impact on the environment. One of the main features of the wind regime is the average monthly speed. It has a well-expressed annual course, formed under the influence of the atmospheric circulation regime and influenced by the type of the laying surface.

Different influence of climatic factors is observed in the different municipalities within the regional territory. This is confirmed by the average annual rainfall values in the municipalities of Gotse Delchev - 193.20 l / m2, Kresna and Petrich - 35.28 l / m2, Blagoevgrad - 40 l / m2 and Yakoruda - 261.68 l / m2.

The data also differ with respect to the average annual temperatures, rainfall and sunny days during the year, which is determined by the geographic location, and hence the diversity of climatic occurrences.

According to the official website of https://www.worldweatheronline.com/, the average annual values of the main climatic factors are presented in the following Table:

Table 4

№	Main climatic factors	Indicators (average per year)
1.	Temperature	13.34 °C
2.	Rainfall	117.08 l/m^2
3.	Wind speed	6.55 m/s
4.	Sunny days	254.55 days/year

Source: www.worldweatheronline.com

The region covers both semi-mountainous and mountainous areas and plains, which means that in some places there are more rainfall and lower average temperatures, while in other places there are higher average temperatures, respectively more sunny days and less rainfall.

The region's environment can be considered good because of the geographic location of the territory, the lack of large pollutant enterprises, the good quality of soil resources, the availability of automatic monitoring stations for the Struma and Mesta rivers, the improved quality of groundwater as a result of reduced fertilization of the agricultural land.

Source of pollution in the region are the vehicles traveling on the E-79 section, crossing the area. Ambient air quality is good, with the exception of partial deviations from the standards, but they are no systematic.

The processing of agricultural lands affects their quality. In this respect, some of these lands have an early stage of erosion processes, developing with different strength.

Noise levels are acceptable and the radiation situation is constantly monitored by authorized institutions. In the district, no excessive values of ionizing radiation have been detected, as well as no sources of radiation pollution.

According to NSI data, business entities operating on the territory of Blagoevgrad district, according to the number of employees, are mainly micro enterprises - 93,70%, followed by small enterprises - 5,30%, medium - 0,90% and large enterprises - 0.10%.

2.2.2. Energy resources

Energy system

The territory of Blagoevgrad district is secured with electricity and all settlements are connected to the electricity grid. The electricity supply in the region is realized by the 400-kilovolt electric power line between Blagoevgrad substation and Thessaloniki substation,

which is the connection between the energy systems of the Republic of Bulgaria and the Republic of Greece. The system is operated and maintained by CEZ Distribution Bulgaria.

The municipality of Blagoevgrad is gasified.

On the territory of Bansko municipality there are three small hydropower plans with a total output of about 7.43 MW and an annual production of approximately 23 million kilowatt hours per year, a photovoltaic power plant with a capacity of 69 kWp and a heating plant in the town of Bansko using the raw biomass for the production of energy. The energy supply in the municipality is diversified through a gas supply network covering the cities of Bansko and Dobrinishte.

The established tourist centers such as Blagoevgrad, Sandanski, Bansko, Dobrinishte, Razlog and Simitli use the heating potential of the hot mineral springs.

Sandanski municipality has one of the leading places for built energy power plants using renewable energy sources, 5 large hydropower plants, formed by the two hydroelectric cascades - Sandanska Bistritsa cascade and Pirin Bistritsa cascade and 12 smaller hydropower plants.

The favorable climatic conditions, in terms of number of sunny days, provoke the investment activity for construction of photovoltaic power plants, as a result of which at present 21 are constructed.

Sandanski municipality is gasified.

In the other municipalities of the region there are intentions for gasification, but at this stage they are in the planning phase and the construction of the relevant infrastructure is forthcoming.

Potential sources of renewable energy on the territory of Blagoevgrad district

The review of the data written in **point 2. Analysis of the current situation in the East planning region** provides information on the main energy resources of the considered territory that can be used for the production of energy from renewable sources as follows:

Mineral water springs

Within the scope of the above mentioned point, it has been written several times that there are hot mineral water springs in the region used in the single SPA tourist centers and in agriculture. However, there is considerable potential for investment in heating, both in greenhouse production and in tourism, which has not been applied.

It is possible to achieve energy savings when replacing energy sources in a large part of the buildings of public importance in the district by combining energy efficiency measures and the use of technologies based on renewable energy sources.

Applicable technology in using this method are ground-bound heat pumps that use groundwater of low depth. The average power consumption of the pumps in relation to the useful heat output is 1 to 4.8, which means that if the power consumption is 1 kWh, the heating power is 4.8 kW.

Forest Fund

A significant part of Blagoevgrad district territory is covered with forests, which are a potential source of raw material base for the production of energy from biomass as wood can also be used for heating. In practice, this is an inexhaustible source of energy because biomass can be restored through afforestation. A characteristic feature of biomass is that it can be converted directly into liquid fuels.

Water resources

The main water resources on the territory of the region are Struma and Mesta rivers and their tributaries. It should be noted that in some areas there are problems with irrigation resulting from the low amount of rainfall. In view of this, it is necessary to carry out a precise analysis of the effect on the environment of the water use of these rivers for the possible production of electricity.

We draw attention to the fact that the mineral springs fall within the scope of the water resources, but because of their great importance to the district, they are described separately.

Sunny days

The annual progress of the monthly amounts of sunshine duration is determined both by the astronomical factors and by the peculiarities of the atmospheric circulation developing by the cloud regime, and to a certain extent by the orographic conditions of the observed areas. For this region the maximum duration of sunshine is in July and August. The annual progress of sunshine duration is with monotonous increase to the maximum and decrease to the minimum in December / January, when the number of days without sunshine is 18-20.

The average annual sunshine quantity for the Republic of Bulgaria is about 2 150 hours and the average annual solar radiation resource is 1 517 kWh m2. The total theoretical potential of solar energy falling on the territory of the country for one year is about 13,103 ktoe. In view of the more dynamic climate change, data variations may occur.

In territorial aspect the Republic of Bulgaria is divided into three solar zones, with an average annual sunshine duration of about 2 150 hours which represents about 49% of the maximum possible.

Chart 39.

Source: Sustainable Energy Development Agency

An interest in terms of economic efficiency in the use of solar thermal installations generates the period late spring - summer - early autumn when the main factors determining the total solar radiation are the most favorable.

In some municipalities on the territory of Blagoevgrad district there is considerable potential for realization of investments in solar power plants due to many sunny days. According to the data from the Sustainable Energy Development Agency, this potential is being utilized, but there are opportunities for the building of extra capacity.

Information is collected from www.worldweatheronline.com on the number of sunny days per year in the municipalities of Blagoevgrad district. The data is summarized and presented in graphical form. It should be noted that due to the specific terrain and geographic location of the studied territory there are differences in this indicator in the different regions.

Agriculture

The European Commission has set a long-term goal by 2050 to develop a competitive, low-carbon, resource-efficient economy, as bioenergy is expected to play an important role in this vision for the future. Europe already has a number of well-established traditional organic industries, such as agriculture, food industry, feed industry, fiber production and forestry. Since current economic growth views energy as a determining factor for production, and given the fact, that the interdependence between energy, environment and economic growth is not immediate, this complex relationship cannot be solved by a traditional linear approach.

Bioenergy plays an important role in the vision for the development of European energy policy, as the most attractive feature of biomass is that it is a renewable source. The burning efficiency of pellets or wood chips creates part of the emissions of solid particles of raw biomass. Pellet burners emit least dust particles from all solid fuel burners. Considering the right sustainable initiatives in the field of forestry and agricultural management, biomass is actually unlimited and sustainable in comparison to fossil fuels.

Blagoevgrad district ranks one of the first places in terms of the size of the agricultural land and the cultivation of crops. Agriculture is a traditional industry that is widely represented in all municipalities on the territory of the region and is the main livelihood of the population.

The total amount of arable land in the district is approximately 155 thousand decares. In this regard, it can be assumed that, due to their exploitation, sufficient biomass (waste plant products) should be generated to produce electricity.

The developed agriculture creates favorable conditions for the accomplishment of future investment intentions related to the production of electricity from renewable energy sources through the use of biomass both for the satisfaction of the individual needs of single farms, as well as for market realization.

The livestock is also widely included in the region, due to the semi-mountainous and mountainous reliefs and the significant forest fund. The following groups of animals are grown in the area: horses, goats, cattle, cows, sheep, pigs, bee families and birds. The good indicators for the development of this sector also identify it as a potential source of biomass.

As a summary of the above, we can say that one of the main sources of energy from renewable energy sources is agriculture.

State of Energy Consumption

The available building fund on the territory of Blagoevgrad district includes:

• Buildings of municipal property;

• State-owned buildings;

• Private property buildings.

The total number of dwellings by 2016 in the district is 140,474 and the number of residential buildings is 79,237. The useful living area in the region is 6 729 033 m2 (in the cities) and 4 429 422 m2 (in the villages). In the structure of the housing fund, the panel dwellings predominate and they are with poor exploitation, thermal, sound insulation and aesthetic qualities, as well as amortized engineering installations. The administrative buildings require major urban planning restructuring and the panel buildings need renovation.

The municipal sites in Blagoevgrad district use solid and liquid fuels for heating, the cost of which is high, due to the moral and physical wear of the ageing phase of the buildings, in particular the windows and doors profiles, the lack of insulation of the walls, the floor and the under roof lighting. These sites are classified in several main purpose groups:

- Administrative - includes the buildings of the municipal administrations, economic, cultural and social facilities;
- Educational - includes schools, kindergartens and auxiliary facilities (hostels, study rooms, canteens, etc.);
- Health - covers medical establishments.

The state of the municipal facilities on the territory of the district does not differ significantly from the state of these facilities in the country.

It is typical for the buildings in the district that they were built in accordance with normative indicators applied in the years before 1970, years in which the impact of the global energy crisis was not yet taken into account. Moreover, during the whole lifetime of these buildings and facilities, insufficient funds have been allocated for their maintenance. This makes these sites a serious energy consumer which consumes huge amounts of money from the already optimized budget of each municipality.

Considering the above, the reduction of energy consumption costs will contribute to the improvement of the ecological environment by limiting the emission of harmful substances (greenhouse gas emissions into the atmosphere) and efficient use of the available resources to produce energy from renewable energy sources with minimal negative impact on the environment.

One of the major energy consumers is street lighting. Many of the municipalities in the district have implemented energy efficiency projects in street lighting.

In Blagoevgrad district there are no large private enterprises, public-private or state-owned, which have an impact on the ecological balance.

2.3. Energy efficiency measures implemented by state authorities at regional level and local authorities and development opportunities

The State energy efficiency policy is regulated at national level by the Energy Efficiency Act, which delegates the powers of regional and local authorities to prepare long-term and short-term energy efficiency plans, identify and implement specific measures, monitor and control their implementation.

Under the abovementioned law, the mayors of the municipalities and the district governors are required to prepare annual reports on the progress made in the implementation of the planned measures in these plans and / or programs and submit them to the Sustainable Energy Development Agency. According to the law, it is the responsibility of the Sustainable Energy

Development Agency to summarize and systematize the information submitted by the municipalities and districts in the country for the implementation of the municipal and / or regional energy efficiency programs.

The analysis of the presented annual reports on energy efficiency from the municipalities included in Blagoevgrad district contains summary information about the implemented energy efficiency measures.

Among the municipalities in the district there is a tendency for implementation of energy saving measures on the buildings and because of the broader possibilities for funding of energy efficiency projects, a significant number of projects are being implemented for improving the energy efficiency of street lighting, gasification, transport measures (fleet replacement) and use of renewable energy sources (installation of biomass boilers / wood pellets, solar collectors for domestic hot water, etc.).

The declared results of the implementation of the energy efficiency plans are based on the audit reports or the own assessments of the municipal authorities.

Some of the reports for the implementation of the energy efficiency programs describe the applied energy saving measures, but there is no assessment of their effect.

According to the data from the reports of the municipalities in the district, the energy saving measures have mainly been carried out in municipal buildings with financial funds from national and European programs, as follows:

Table N5

Type	Name of the source of funding
БГ04	Program BG04 "Energy Efficiency and Renewable Energy"
НДЕФ	National Trust EcoFund
КБ	Project "Beautiful Bulgaria"
ДФЗ	State Fund Agriculture
ЕСКО	ESCO contract
ПТС	Program for territorial cooperation between the Republic of Bulgaria and the Republic of Macedonia
ОПРР	Operational Program Regional Development
СИФ	Social Investment Fund

НБ/СИФ	National budget and own funding
ДАРЕНИЕ	Donation + Own financing
ДРУГО	Other sources

Source: Sustainable Energy Development Agency

In 2016, 20 buildings with a total built-up area of 56,594 m2 were audited in the district. Information on the assessment of the expected effect of the energy saving measures prescribed in 2016 in the audit reports is presented in the following table:

Table 6

Municipalities with audited buildings	**Audited buildings in 2016**	**built-up area of audited buildings sq. m.**	**Necessary investments thousand BGN / year**	**Saved fuels and energies MWh/year**	**Saved money thousand BGN/year**	**Saved CO_2 emissions tons/year**
3	20	56 594 $м^2$	3 339	2 618	395	649

Source: Sustainable Energy Development Agency

In the district the cities with a population of more than 20 000 inhabitants are Blagoevgrad and Petrich, which external lighting systems are subject to compulsory auditing, according to Art. 57, para. 2, point 4 of the EEA.

In 2016 a street lighting audit was conducted in Belitsa, Blagoevgrad district. The estimation of the expected effect from the energy saving measures prescribed in 2016 is 9 MWh / year energy savings, 2 thousand BGN / year savings of money and 7 tons of CO2 emissions savings. The necessary investments for the implementation of the energy saving measures amount to approximately BGN 239 thousand.

A high energy-saving effect has been achieved by the energy saving measures implemented in 2016 on building enclosure elements (replacement of window profiles and thermal insulation of external walls, roof and floor).

2.4 Information on renewable energy sources and development opportunities

The state policy in the field of renewable energy sources is regulated at national level by the Renewable and Alternative Energy Sources and Biofuels Act, which delegates powers to regional and local authorities to develop long-term and short-term plans to promote the use of renewable energy. In this regard, local and regional authorities have the obligation to prepare

annual reports on the measures implemented in the respective plans provided to the Sustainable Energy Development Agency.

According to the data from the Sustainable Energy Development Agency, the municipalities in Blagoevgrad district submitted Municipal programs for the encouragement of the use of energy from renewable sources, operating in 2016 and after this year are:

Table N 7

Number of municipalities	Municipalities with operating programs in 2016	Municipalities with operating programs after 2016	Municipalities without operating programs after 2016
14	**5**	**4**	**10**

Source: Sustainable Energy Development Agency

In connection with the above mentioned data it is necessary to update the prepared programs in order to comply with the legal requirements of the legislation.

The implemented measures for utilization of energy from renewable sources in 2016 in the Blagoevgrad region are listed in the following table:

Table N 8

Type of energy from renewable sources	Type of energy produced	Installed power (Kw)	Annual output (MWh / year)	Investments (BGN thousand)	Number of measures
BIOMASS	Heat	174,0	50	23	1
SOLAR	Electrical	0,5	2	36	1
TOTAL:		**174,5**	**52**	**59**	**2**

Source: Sustainable Energy Development Agency

The overall economic and environmental effects of the implemented technical measures for energy production by renewable sources in Blagoevgrad district include:

Table N 9

Type of energy from renewable sources	Type of energy produced	Energy Savings and Fuels (MWh / year)	Money Savings (BGN thousand)	Savings of CO2 emissions (tonnes year)	Number of measures
BIOMASS	Heat	27	2	9	1
SOLAR	Electrical	22	5	18	1
TOTAL:		**49**	**7**	**27**	**2**

In the structure of measures implemented by the National Renewable Energy Action Plan for 2016 in the district, Information campaigns among the population of the respective municipalities prevail. The campaigns are on the support measures, the benefits and practicalities of the development and use of the energy from renewable sources, and Measures for the use of renewable energy in construction or reconstruction, major renovation, overhaul or readjustment of buildings - municipal property.

According to the submitted plans, the planned municipal measures for the promotion of the use of energy from renewable sources under the National Renewable Energy Action Plan are related to the use of energy from renewable sources in construction or reconstruction, major renovation, overhaul or reconstruction of buildings - municipal property (almost 25%) and planned information campaigns among the population.

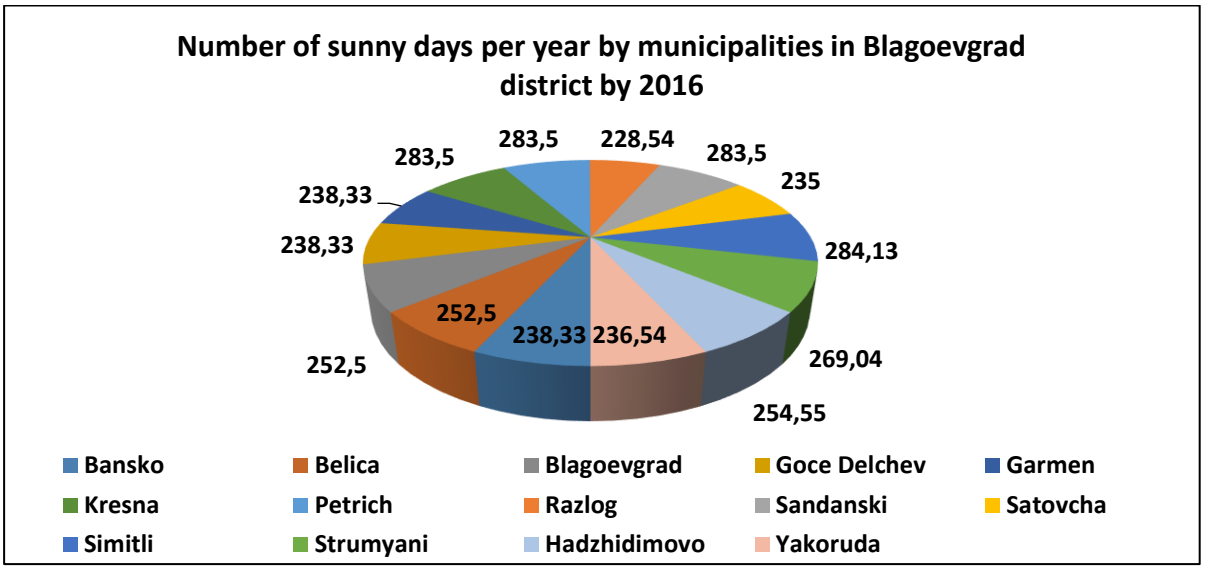
The analysis of the above-mentioned data on the district shows that investments in the production of energy from renewable sources from biomass and sun have been accomplished with priority, which can be explained by the favorable climatic factors and geographic position of the municipalities in the region.

Despite the favorable factors, the implemented measures by the National Renewable Energy Action Plan in 2016 are few and generally weak investment activity is observed.

The prospects for the production of energy from renewable sources on the territory of Blagoevgrad district are summarized by type of energy sources as follows.

The following chart provides information on the number of sunny days in the municipalities within the district.

Chart 40.



Source: www.worldweatheronline.com

According to the presented information in the municipalities of Garmen, Kresna, Petrich, Sandanski, Simitli and Strumyani, there are a considerable number of sunny days per year, which is why their territories are advantageous for investments in the construction of photovoltaic power plants.

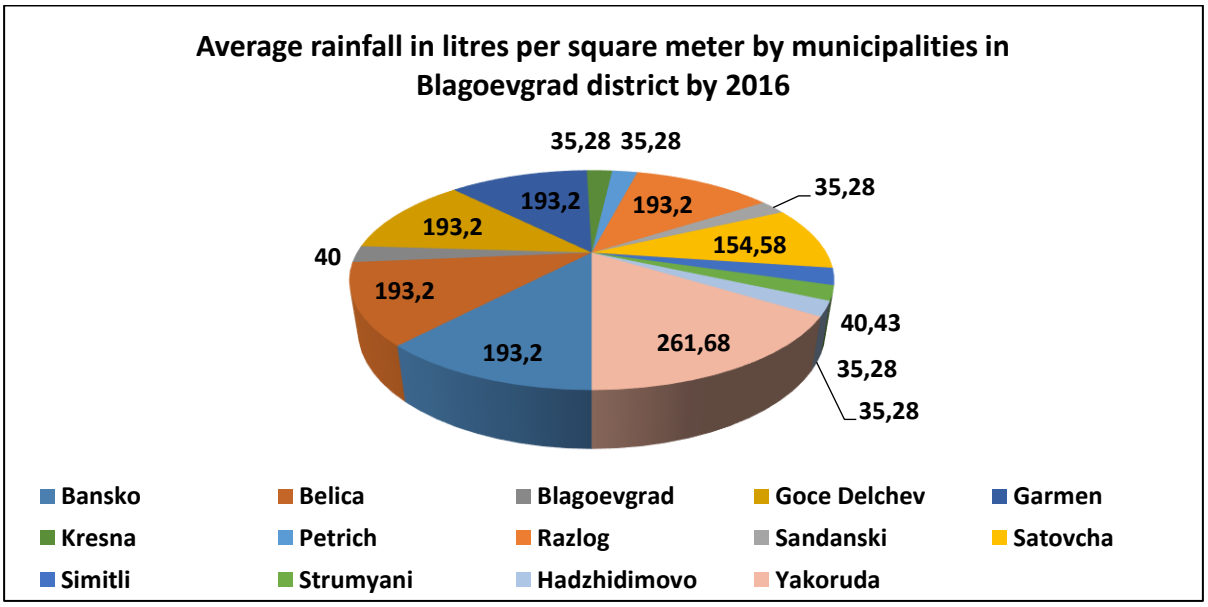
It should be noted that the municipality of Sandanski is the leading in the field of the installations for the production of electricity from water and sun.

Excellent prospects for the production of heat energy provide the hot springs in the district. The potential is already being used, a proof of which are the very well developed hotel facilities in the municipalities with well-developed tourism such as Sandanski, Bansko, Razlog, etc.

The presence of well-developed plant and livestock breeding outlines good prospects for biomass energy production due to the generation of an extremely large number of waste products, which are the main raw material for this type of production. Agriculture is a traditional branch in Blagoevgrad region and will most likely continue to develop in the future, which will provide a significant raw material for the production of bioenergy.

Despite the large number of HPPs and small HPPs in the municipality of Sandanski, the investment in the production of electricity from water is low in the district because the area has limited water resources. Taking this into account, the opportunities for investment in the construction of hydro power plants on the territory of Blagoevgrad district should be carefully analyzed.

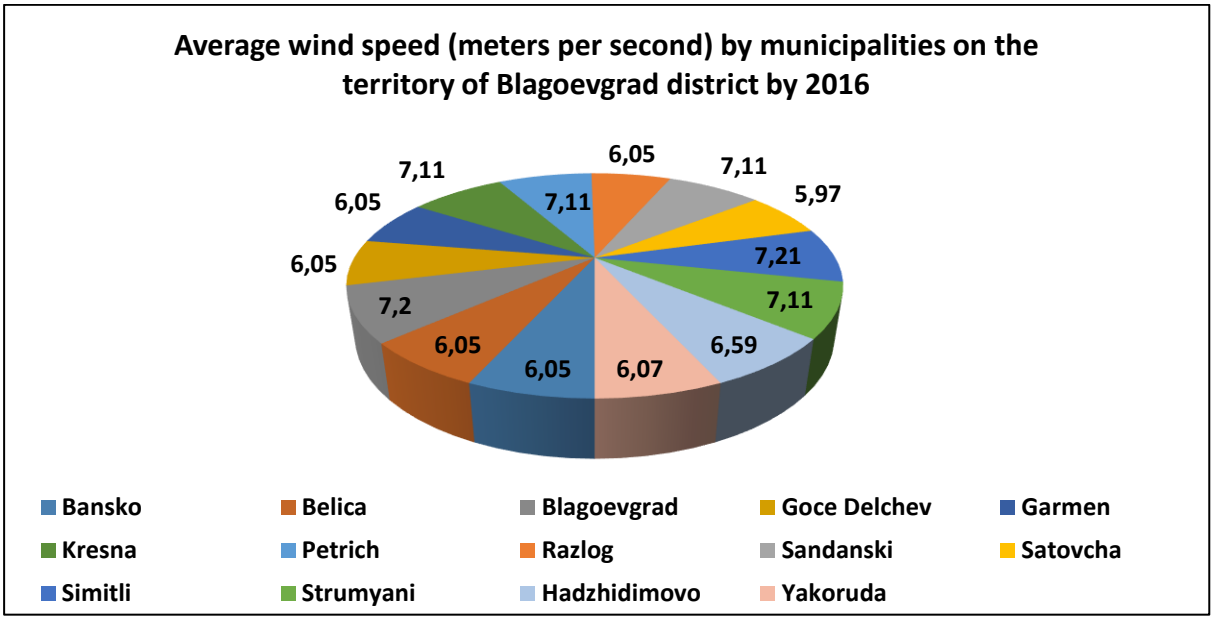
Chart 41.



Source: www.worldweatheronline.com

The average wind speed in Blagoevgrad region is 6.55 (m / s).

Chart 42.



Source: www.worldweatheronline.com

The average wind speed is the highest in the municipalities of Simitli, Strumyani, Kresna and Petrich due to the presence of semi-mountainous and mountainous relief in the area of the district. These locations are conducive to launch activities for carrying out further studies on the possibilities to exploit the potential of wind power.

2.5. Assessment of the energy resources - East planning region of the Republic of Macedonia

2.5.1. Factors influencing energy planning

The main factors influencing energy planning are given in 2.2.1. of this document.

The East planning region of Macedonia is a territory that is not rich in natural resources.

The population in the region is approximately 177 (thousand people) by 2015 and it is mainly concentrated in larger urban centers.

The climate in the region is dry, with long and dry summers and high temperatures, reaching even to + 41 ° C, light and wet winters with temperatures that can go down to -20 ° C and more. The reason for the sharp amplitude is the influence of the Mediterranean and continental climate.

The average annual temperature is about 12.9 ° C. The highest temperatures are measured in August, and the lowest in January. The wind blows all year round. The climate is appropriate for the development of agriculture and, in particular, rice growing.

2.5.2. Energy resources

Energy system

The electricity generation system in the Republic of Macedonia consists of thermal power plants and hydroelectric power plants. TPP "Bitolya" (Pelagonian planning region) and Oslomey (Southwest planning region) mainly use local resources - lignite coal, while TPP "Negotino" (Vardar planning region) is working on the import of fuel oil.

The total capacity of the thermal power plants for annual electricity production is about 6200 GWh, and the largest producer is the Bitolya TPP with a total annual production capacity of about 4350 GWh. Given the exhaustiveness of lignite beds in operation, the existence of other coal basins in the Republic of Macedonia is of great importance.

The main coal reserve is concentrated in the Mariovski (110 million tons reserves) and Tikveshikot basins (70 million tons of reserves) in the Pelagonian and Vardar regions, the Brod Gneotino deposit in the Pelagonia region (45 million tons of reserves) has already been activated as a source of fuel for TPP "Bitolya".

The climatic conditions in the East planning region favor, on the one hand, the realization of investments for the construction of HPPs and small HPPs, etc. and, on the other hand, the production of energy from photovoltaic power plants.

Hydro power plants are mainly located in the western part of the country, and small HPPs are distributed throughout the country. In medium hydrology, hydropower plants can provide up to 1300 GWh of electricity per year.

According to the production capacity, the largest are the hydroelectric power plants of the river Vardar (Polo planning region), Spili and the Globul of the river Krum Dram (Southwest planning region), Tikvesh on the Black river (Vardar planning region) and Kozyak on Treska river (Skopje planning region).

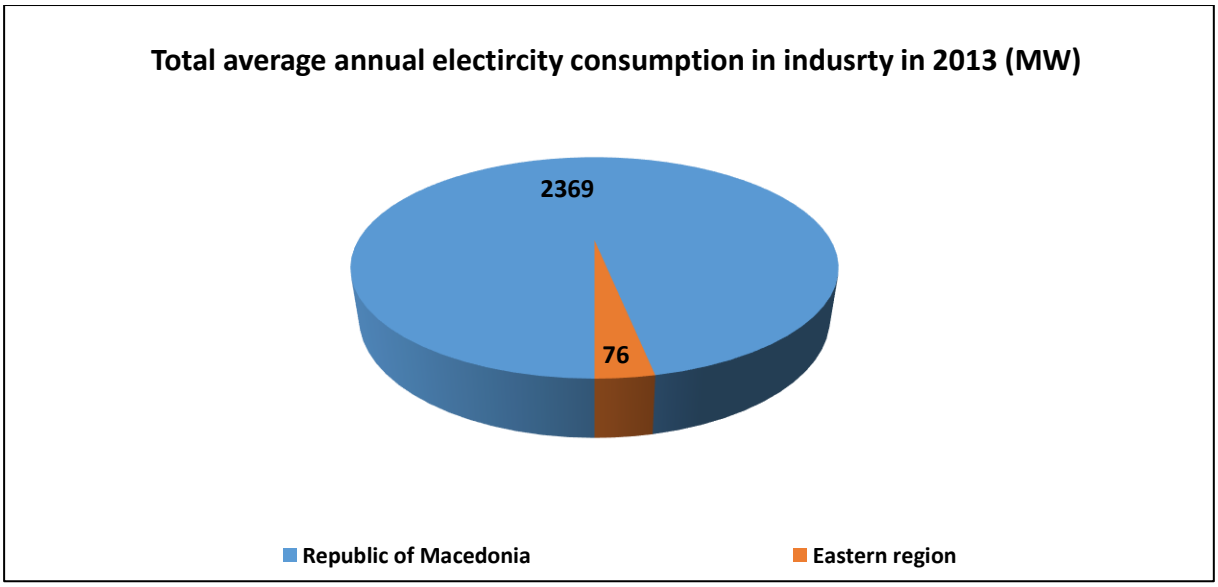
In the thermo-energy sector, the TE-TO gas-fired power station is under construction in Skopje with an average annual electricity output of about 1,500 GWh. The building of a combined gas plant Energetika in Skopje is also planned and it will have an average annual electricity output of 2000 GWh.

According to information from the State Institute for Statistics , the total installed capacity for electricity generation in the East planning region by 2013 is 17 MW, compared to 1938 at national level. In relative terms, this represents 1.03% of the total installed capacity in the country.

The official statistics show that in 2013 the total annual average electricity consumption in the Eastern region is 75 GWh,which is around 3.1% of the total industrial consumption in the Republic of Macedonia.

Chart 43 contains information on the total average annual electricity consumption in industry in the region.

Chart 43.



Source: SIS

In addition, there are advantageous conditions for exploiting the potential for renewable energy production such as geothermal, biomass and wind energy. Geothermal energy can be of great importance for the development of agriculture in the East planning region. In Ovce Pole there is an opportunity for building of wind farms.

In the municipality of Kochani there are favorable prerequisites for greenhouse production and production of energy for heating during the winter season due to the presence of geothermal waters.

Utilizing the potential for renewable energy production will contribute to positive economic and environmental effects, given the dynamic environmental changes that affect all aspects of socio-economic life.

Potential sources of renewable energy in the East planning region

The production of energy from renewable energy sources is a major priority of the EU and of the Republic of Macedonia, given that the country would like to be part of the European community, which requires the synchronization of the national legislation with the European one, including laws, strategies, plans, programs, etc.

The negative environmental impact of primary energy from fossil fuels, mainly lignite and fuel oil, is the main reason for restructuring the energy sector and increasing the share of renewable energy production.

Renewable energy sources in Macedonia that are used are primarily hydroelectric power plants (for the production of electricity), biomass (largely wood for domestic heat), geothermal energy (to the highest degree of warming greenhouses) and modest share for solar energy (for hot water in households).

The general characteristics of the energy infrastructure of the Republic of Macedonia are: obsolete technologies and lack of investment to maintain, modernize and expand existing facilities, as well as to build new facilities; high total electricity losses (technical and commercial); low energy efficiency; unfavorable structure of the types of energy (production, imports and consumption) from an environmental and economic point of view and in terms of security of supply; presence of monopolized structures in certain sectors.

The review of the data referred to in point "**2. Analysis of the current situation in the East planning region"** provides information on the main energy resources within the region that can be used to produce energy from renewable energy sources as follows:

Mineral springs

Studies on geothermal potential in the Republic of Macedonia show that there are no sources for the generation of electricity. For this purpose, a geothermal water temperature of at least 120 ° C is required in order the project to be economically viable.

In the East planning region, in Kochani, an installation for heating of administrative facilities and for preparation of hot water in the paper factory (which is still out of operation for an extended period of time) has been built. The heating of the buildings is provided with minimal energy (several administrative buildings in Kochani, Tsar Samuil hotel complex, accommodation in the vicinity and the object in Negorski Bani). Over the last few years, this source has been reduced. Certain activities for the modernization of the geothermal system in Kochani have been undertaken and are being implemented with the financial support of the Austrian Government. A new pit and a new drilling site in the Kochan Field area are in the process of construction.

Forest Fund

The types and regional distribution of biomass sources in the Republic of Macedonia depend on the characteristics of each region individually. Biomass is the most common in the agricultural and forest areas of the country. Of the total biomass used for energy purposes, wood and charcoal occupy 80%. In the Republic of Macedonia, some of the branches of vines, rice flakes and fruit tree branches are also used for energy purposes, but large part of the straw is mainly used for fertilizers, feed and pulp production. Therefore, it is not available for energy purposes.

Within the scope of the East planning region, a significant area covered by forests is included. They represent a huge resource base to ensure the production of energy from biomass. The region characterizes with semi-mountainous and plain areas, which are an inexhaustible source, given their possibility of restoration through afforestation. The East planning region is at one of the first places by the presence of woodland, which is a favorable prerequisite for realizing future investment intentions for the utilization of the waste products (biomass).

Water resources

Two small hydropower plants - Kalimanci and Zrunovich - are built in the region of the East planning region. With the construction of the Zletovitsa hydroelectric system, conditions for electricity generation were created through the planned small HPPs of the Slezica system, on the Bregalnitsa river and its tributaries: the rivers Orizarska, Zranska and Kochanska. In addition, the sites for the construction of small hydropower plants have been identified. In view of this, we can state that the potential for energy production from water is being utilized, but further action can be taken in this direction.

Sunny days

According to the data from the Strategy for Development of Energy in the Republic of Macedonia by 2030, there are 4,280 solar collector systems installed in the country in 2006, with a total installed capacity of 12MW and an area of 17,000m2, supplying heat of 7,4 GWh. An interest in terms of economic efficiency in the use of solar thermal installations creates the

period late spring - summer - early autumn when the main factors determining the total solar radiation are the most favorable.

In some municipalities in the East planning region, there is considerable potential for investing in solar power plants due to most sunny days.

Agriculture

The sector has a huge impact on the population and the economy in the region, as it provides basic employment for the residents and is actually the only source of income.

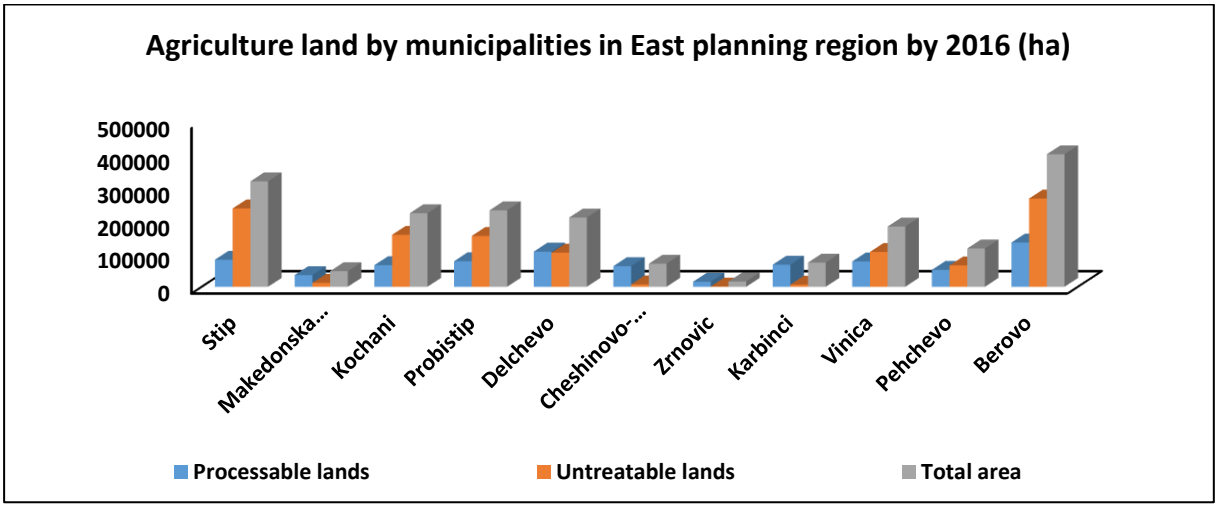
Agriculture and forestry do not represent a major burden as energy consumption. Their share is below 2% of the total final energy consumption in the Republic of Macedonia. Energy consumption in this sector has declined over the past 10 years. In the structure of energy raw materials used in agriculture, oil products predominate with 63% (for agricultural machinery and greenhouse heating), followed by geothermal energy (heating greenhouses) with 27%, electricity by 7% and biomass by 3%. Similar is the distribution of energy business in European countries, but with one condition that the use of geothermal energy is negligible, and instead the participation of electricity and the use of natural gas is greater.

Bioenergy is one of the priorities of the European energy policy and it has key importance to achieving a low-carbon economy given the wide variety of raw materials that agriculture provides, including: pellets, wood chips, animal waste, etc.

The East planning region ranks one of the first places on the share of farmland and crop growing compared to other planning regions.

The total arable land in the region is approximately 772 thousand decares.

Chart 44.



Source: SIS

The size of uncultivated agricultural land - 1 113 210 decares - is a huge potential, which should be utilized through targeted policies and measures to encourage the cultivation of these areas. Actually there are favorable opportunities for biomass energy production if good conditions are provided to increase investment activity.

As a conclusion, given the specifics of the territory under consideration and the importance of the economic development of agriculture, the sector is a huge source of raw materials for biomass production.

State of Energy Consumption

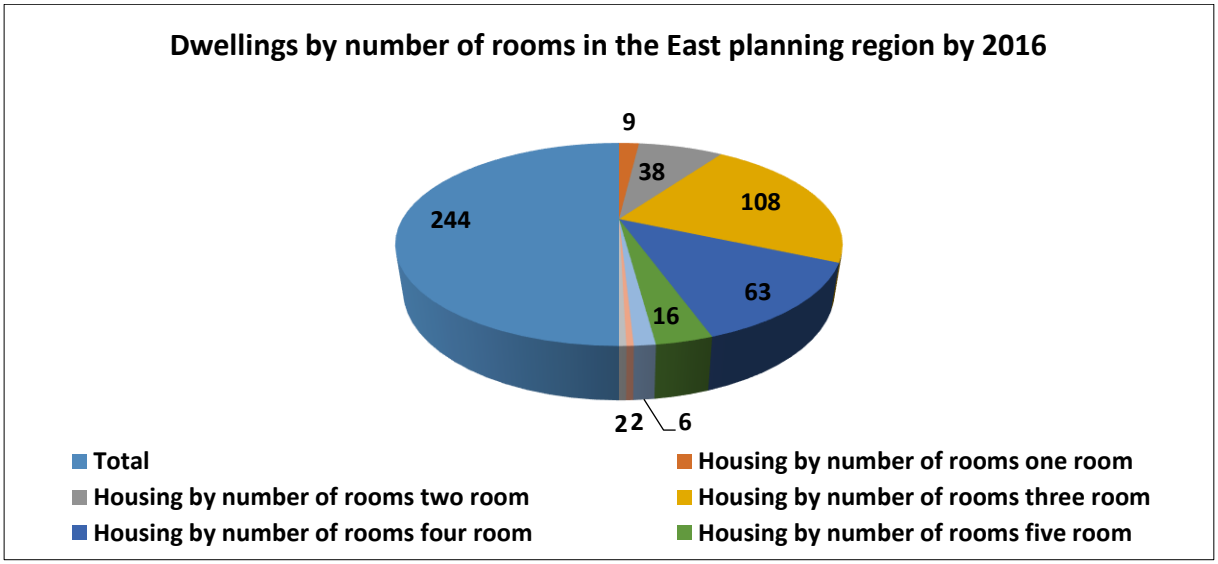
The available building stock on the territory of the East planning region includes:

• Buildings of municipal property;

• State-owned buildings;

According to the following chart, the total number of residential buildings in the region by 2016 is 244.

Chart 45.



Source: SIS

In the structure of the housing fund, panel dwellings that are characterized by poor operational, thermal, noise and aesthetic qualities, as well as amortized engineering installations are predominant. Administrative buildings require major urban restructuring and panel buildings - renovation.

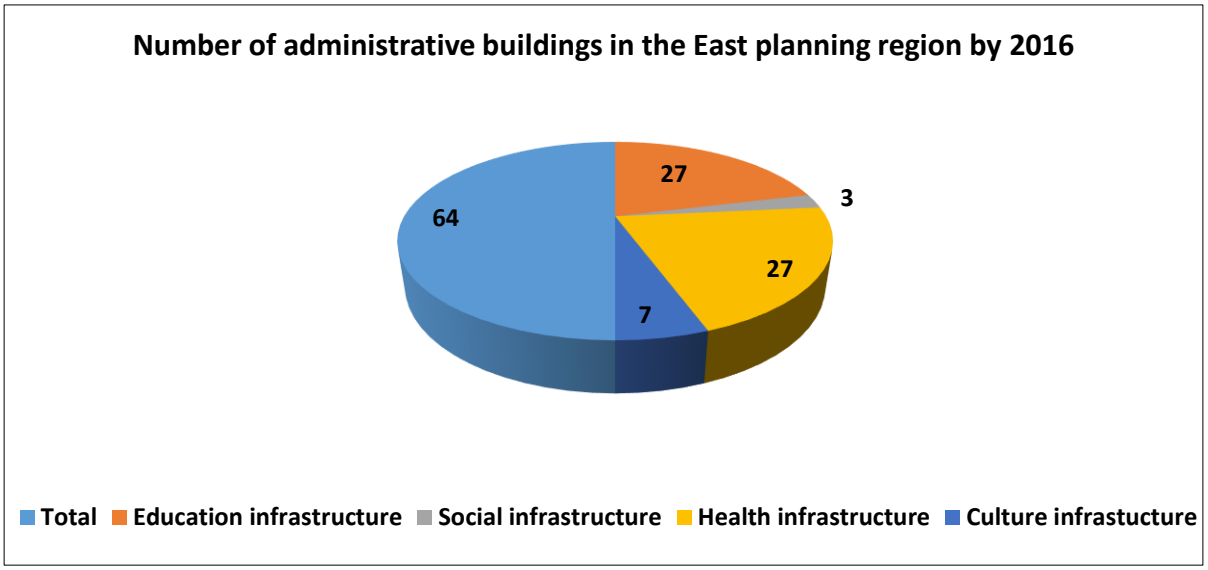
Taking this into account, it would be reasonable to pursue a targeted policy aimed at improving the energy performance of residential and administrative buildings, including a set

of activities related to energy audits, reports, etc., on the basis of which specific energy saving measures to be planned. Their application will contribute for the extension of the lifetime of the relevant buildings, the reduction of emissions of harmful substances as a result of the proposed engineering solutions for limiting energy consumption, improving comfort and quality of life.

The physical condition of the buildings built up many years ago is a huge problem that should be solved with priority by the joint efforts of regional and central authorities due to the need to provide significant financial resources for major repairs to improve the operational and energy performance of buildings. In this regard, we note the positive fact that the authorities in the Republic of Macedonia have taken targeted actions to provide mechanisms for financing the energy-efficient activities.

The number of administrative buildings on the territory of the East planning region is as follows:

Chart 46.



Source: SIS

The buildings owned by the local authorities within the East planning region are predominantly heated on solid and liquid fuels which are low effective and serious pollutants. The costs for these buildings are high due to the moral and physical wear of buildings at an advanced stage, in particular the windows and doors profiles, the lack of insulation of the walls, the floor and the under roof lighting.

According to the purpose of the buildings they are divided into:

- Administrative - covers the buildings of the municipal administrations, economic, cultural and social facilities;
- Educational - schools, kindergartens and auxiliary facilities (hostels, study rooms, canteens, etc.);
- Health - includes medical establishments.

The condition of the above mentioned sites and facilities within the analyzed territory does not differ significantly from the state of these sites in the country. The buildings are morally and physically obsolete because they are constructed in compliance with norms and requirements that do not take into account the current energy sector challenges, the new building technologies, and the specific features of the used materials.

In the structure of the budget expenditures of each municipality a significant role plays the street lighting, which generates extremely high values of the money due for electricity.

New realities related to changes in the energy legislation at European level call for the establishment and implementation of targeted policies aimed at improving the comfort of buildings, reducing energy consumption and optimizing electricity costs.

The implementation of energy efficiency measures in combination with investments in the production of energy from renewable sources will have a positive impact on the environment, the quality of life and habitation in the sites, and last but not least, they will contribute to enhancing energy culture, change in thinking and the behavior of people as a result of the "visible" results achieved so far.

Both in the Blagoevgrad region and the Eastern region of the Republic of Macedonia there are no major pollutants which, on the one hand, have a positive effect on the environment, but on the other hand there is a negative impact on the prospects for economic development and hence the improvement of the social conditions.

2.6. Energy efficiency measures implemented by state authorities at regional level and local authorities and development opportunities

The key documents defining the energy efficiency policy in the Republic of Macedonia are:

- National Strategy for Sustainable Development;
- Energy Act;
- Strategy for the development of energy;
- Strategy for renewable energy sources.

The State Energy Efficiency Policy is regulated at national level by the Energy Act, according to which the local authorities have the obligation to create and implement policies in the field of energy efficiency, which is done through the development of programs, plans and related reporting documents to them.

The Republic of Macedonia has made a significant progress over the last few years in creating a strategic and legal framework for energy efficiency that offers good opportunities for future actions for the implementation of specific energy efficiency improvement programs. In order to achieve improvements in the field of energy efficiency in the building sector as well as to achieve the strategic objectives and tasks foreseen in the Energy Development Strategy of the Republic of Macedonia by 2030, the Strategy for Promotion of Energy Efficiency in the Republic of Macedonia by 2020 and the first Energy Efficiency Action Plan of the Republic of Macedonia by 2018, the government of the Republic of Macedonia intends to approve the National Energy Efficiency Program in Public Buildings (NEEP). It will be coordinated by the Ministry of Economy. The aim of the program is to rehabilitate existing public buildings in Macedonia, both nationally and locally.

The aforementioned program covers and analyzes 2441 public buildings with a total heating area of 2,265,944 m2, including those in the East planning region. As a result of applying a sophisticated methodology, the total amount of public buildings is divided into 44 models of public building groups that have been studied and subjected to calculating their energy saving potential. The energy efficiency potential is determined by realizing the value and monetary savings of the representative buildings in each subsector and group of buildings using the same heating regime. The calculation of the energy saving potential of selected models of groups with public buildings is based on the applicable energy efficiency improvement measures that are appropriate to their energy efficiency.

The main energy saving measures for heating energy are: thermal insulation on the external walls, replacement of existing windows and exterior doors with new, energy-efficient, thermo-insulation of the roof, thermal insulation of the floor, installation of automatic control systems for the operation of existing heating substations in public buildings, connected to the central heating system, reconstruction of boilers in the existing hot water heating systems, installation of automatic control systems in boilers of existing heating systems, replacing existing firewood stoves with new, high-efficiency burners, replacing existing radiator masks in kindergartens with new ones that allow better heat radiation from the radiators.

According to the National Program, special strategies are proposed to finance EE investments for state institutions and municipalities, since municipalities have the opportunity to use part of their own funds, while state institutions almost fully realize their revenues from the funds provided by the central government. Considering their dependence on the central government in terms of revenue and loan bans, there are several options for financing state institutions that are feasible. The Ministry of Finance could provide state institutions with additional funds for energy efficiency projects and provide a "payout" in the form of reduced expenses for the state institutions in the coming years.

According to the document "Analysis of Local Energy Efficiency Programs in Macedonia - conditions, challenges, solutions" (Analysis), not all municipalities in Macedonia comply with

their obligation, implied by the Energy Act, to develop three annual energy efficiency programs, annual plans and to provide information on the performance achieved in the previous year to the Energy Agency due to a shortage of competent administrative staff and financial resources.

In spite of the established legal framework, an accessible public analysis of the state of the accepted energy efficiency programs and those currently in the process of implementation, covering a large number of municipalities, has not been prepared. This analysis is essential to identify the challenges and positive examples as well as to make an immediate assessment of the situation regarding the adoption and implementation of energy efficiency programs.

The purpose of this analysis is to determine the quality of the adopted local energy efficiency programs and those in the process of implementation and to evaluate the envisaged measures, to identify the positive examples and problems in order to make recommendations to decision-makers to improve the situation. The ultimate goal is to contribute to improving the quality of municipal energy efficiency programs and thus to contribute to the implementation of the national renewable energy and energy efficiency goals and policies.

According to the data in the document “Analysis”, the municipalities in the East planning region, which have drawn up municipal energy efficiency programs, are Pehchevo, Shtip, Berovo, Kochani, Delchevo, Probishtip. In this respect, it is advisable to introduce specific measures for compliance with the obligations of the municipalities, as these documents are fundamental for the implementation of the identified measures, which will contribute to the achievement of the set goals.

A good practice related to the preparation of municipal energy efficiency programs was created in the Vardar planning region, where the Center for Development of the Vardar planning region develops such type of planning documents and thus avoids the use of external consultants who in most cases copied information from existing documents.

The analysis showed that, with regard to the measures envisaged in the programs, those related to the implementation of EEs in public places prevail, and to a lesser or greater extent households have been bypassed. In view of the national strategic energy goals, this trend should change.

The measures that usually dominate in the municipal programs are related to roof insulation, façade insulation, changing of windows and doors, modernization of lighting, installation of automatic regulation in the energy systems of buildings and thermostatic valves, etc. In addition, most programs have a list of energy efficiency tips such as cleaning the boiler, purchasing efficient equipment, etc.

Most of the municipalities in the East planning region, that have submitted EE programs, have annual implementation plans. The latter are essential for achieving compliance between the

policies and measures taken by the national, regional and local authorities with a view to meeting the objectives and expected outcomes.

2.7. Information about renewable energy sources and development opportunities

The state policy on renewable energy sources is regulated at national level by the Energy Act, which delegates powers to regional and local authorities to draw up long-term and short-term plans to promote the use of energy from renewable sources.

Energy efficiency and renewable energy measures usually proceed together and renewable sources are important for switching from fossil energy sources to biomass, water, wind or sun, and these are still unutilized potential for the Republic of Macedonia, especially solar energy.

Another argument in support of the importance of the measures for renewable sources at local level is their contribution to achieving the state goals for renewable sources and a cleaner environment.

In this part, according to the potential for development of renewable sources, the municipalities are grouped at ambitious levels: municipalities without measures for renewable sources (ambitious level 1), municipalities with declaratory mention of renewable energy sources (ambitious level 2), municipalities with several renewable projects (ambitious level 3) as well as municipalities with many and more ambitious projects in this area (ambitious level 4).

The municipality of Stip from the East planning region has an ambitious plan for renewable energy sources that has a specific goal to increase the share of this energy to 20%. The municipality has prepared surveys for windmills and studies on the use of solar energy are under preparation.

In the East planning region, the share of energy produced by water is relatively high, while the potential for solar, biomass and wind power utilization has not been sufficiently used yet.

Geothermal energy can be of great importance for the development of agriculture in the East planning region. In Ovce Pole, which has a relatively favorable climate and meteorological destination, there is an opportunity to build wind farms.

Agriculture is a traditional industry sector in the East planning region and it will most likely continue to develop in the future, which is why we believe that the generated plant and livestock waste products will provide enormous resource potential.

According to the spatial plan of the Republic of Macedonia, the construction of new hydroelectric power plants is intended, of which the greatest importance according to the annual capacity for electricity generation would have HPP Galishe and HPP Chebren, which are planned to be built on the Cherna river, HPP on Vardar river and Boskav bridge on Mala river. The newly built hydropower plants could provide an additional 2270 GWh per year for

medium hydrology. Apart from the above, the Republic of Macedonia has quite a lot of potential to build small hydropower plants located at about 400 locations across all planning regions that are already identified and they can provide about 10% of the country's current electricity needs.

The East planning region is quite popular with its geothermal springs. Here is the largest geothermal water field in the Balkans. The most famous geothermal springs in the region are: Podlog, Banya, Istibanya and Keizovitza.

The geothermal spring of Podlog is the largest basin in the Balkans, and is also the largest non-magnetic spring with a 150m² water reservoir and an average temperature of 75 ° C. The chemical composition of the water is sodium bicarbonate having a pH of 7 that is not aggressive in a closed system. The presence of selenium, fluorine and other elements within the limits of what is allowed is what makes it possible to the water to be considered as potable (confirmed by the American company GeoTermEX and the Austrian consortium ARGE GTM). Since February 2011 the geothermal water in the Dolni Podlog - Kochani system has been processed. The so-called double system provides rational and environmentally friendly water purification. The geothermal system with a capacity of 300 l / s performs the operation and distribution of water to the end user for the following purposes:

- Heating of agro complexes - greenhouse production;
- Low temperature processes;
- District heating of the city center;
- Balneology goals.

The spring in the village of Banya, Cheshinovo, Obleshevo district was a common well in the past. Today it is a spa center with great opportunities. Spa services are provided with 63 ° C water. The water has healing properties that have a good effect on the following diseases: diseases of the bile duct and gall bladder, gynecological diseases, inflammation of the nerves, rheumatic and other diseases, but the best healing properties water has on diseases such as stomach ulcer and duodenal ulcer. The water can also be used for inhalation, with a beneficial effect on the respiratory system. The spa center does not work at the moment, but the spring has a great potential and awaits its new owner.

The Istibanya hydro-thermal spring is located on the outskirts of the village of Istibanya in Vinnitsa. It is similar to the one in Podlog – Banya, with a capacity of 56 l / s and a temperature of 67 ° C but its actual capacity is 50 l / s and 63 ° C.

Kezovica is an active spa center for eighty years and its history dates back to Turkish times. The same is used for healing purposes as well as for the hygiene of the population. Its existence is described in various documents and is believed to have been built by the Turks at the end of the 17th century as a primitive building with a swimming pool. The thermal springs are situated around Kežovica Spa and because of its radioactivity it is considered one of the

most radioactive thermal springs not only in the Republic of Macedonia but also in the Balkan Peninsula. Kezovica Spa has a size of 6405 m2. There are two buildings - one for spa services, the other for accommodation. Today Kezovica Spa draws water from two shallow springs with a capacity of 4.5 l / s and a temperature of 63 ° C.

Taking into account the number of sunny days per year on the territory of the East planning region, there are favorable prerequisites for realizing investment intentions related to the production of energy from photovoltaic installations. At this stage, this potential has not been utilized due to the restrictions, considered in this document, mainly financial.

The government in the Republic of Macedonia makes significant efforts to promote the use of renewable energy sources and the expected results are likely to be "visible" in the near future.

As a summary of the above, the next paragraph contains information on the prospects for development and the existing constraints in the cross-border territory.

2.8. SWOT analysis - cross-border region - Blagoevgrad region (Republic of Bulgaria) and East planning region (Republic of Macedonia)

The purpose of this analysis is to identify the strengths and weaknesses, opportunities and threats in the cross-border region - the Blagoevgrad region and the East planning region, on the basis of which the main objectives, priorities and measures to be outlined that will have the most positive impact in the region.

An analysis of the information for the profiles of Blagoevgrad district and the East planning region in Macedonia was carried out, the results of which are summarized in the following table.

Table N10

SWOT ANALYSIS OF THE CROSS-BORDER REGION – BLAGOEVGRAD DISTRICT AND EAST PLANNING REGION	
STRENGTHS	**WEAKNESSES**
• Good geographic location of the region (the Bulgarian part of the cross-border region is an external EU border); • A favorable climate for leisure and recreation, a variety of natural landmarks; • Preserved and clean environment; • Relatively good demographic indicators and a high level of education; • High economic activity of the	• Low wage level; • Low living standard; • Insufficient investment level in the area; • Low labor productivity; • Concentration of basic economic activities in agriculture and tourism; • Low level of technological development and innovation; • Unbuilt infrastructure between some

SWOT ANALYSIS OF THE CROSS-BORDER REGION – BLAGOEVGRAD DISTRICT AND EAST PLANNING REGION	
population; • High employment rate and low unemployment; • Rich cultural and historical heritage; • Highly developed agriculture; • Developed tourism on the territory of the region; • Territory rich in mineral springs; • Established higher education institutions with traditions; • Good and qualitative administrative services; • Well-developed transport and energy infrastructure; • Appropriate climatic conditions for realization of investments in the production of energy from renewable energy sources; • Excellent ambient air quality; • Good age structure of the population;	settlements; • Insufficient coverage of the built sewerage network in some settlements; • Lack of opportunities to increase local income; • Continuous lack of co-financing the budget for the realization of capital expenditures; • Insufficient development of administrative electronic services; • Shortage of highly qualified personnel in the required business areas; • Morally and physically outdated building fund; • Poor technical condition of the constructed long-distance road network; • Worsened health services and limited access to them; • Deficiency of management and expert personnel in the territory of the cross-border region; • Polarization of the municipalities in terms of industrial production; • A necessity to create and implement targeted policies to support and promote the business and the investment activity as a whole; • Poor financial condition of the cultural infrastructure sites; • Lack of protectionist policy and measures to encourage local producers of vegetable and animal products; • Fragmentation, small size and remoteness of most of the agricultural land.

SWOT ANALYSIS OF THE CROSS-BORDER REGION – BLAGOEVGRAD DISTRICT AND EAST PLANNING REGION	
	• Existence of a large number of private farms and micro-enterprises in the semi-mountainous and / or mountainous parts of the cross-border region; • Heavy administrative procedures (an issue at central, regional and local level); • Deterioration of the health provision of the population.
OPPORTUNITIES	**THREATS**
• Development of transport infrastructure; • Improving the economic relations in the cross-border region; • Development of tourism in all its aspects - eco, cultural, spa, skiing, etc .; • Carrying out a marketing campaign for the promotion of tourist sites and the attractive cultural and historical heritage; • Surveys on the possibilities of realizing a public-private partnership on the territory of the cross-border region. Attracting strategic investors for the development of the industry. Analysis and assessment of the potential for renting or participating with real estate in future investment intentions of the existing infrastructure sites; • Facilitating administrative procedures and assistance from the local authorities in the preparation of documents related to the realization of investment activities; • Modernization of agriculture by bringing together individual farms in collective organizations that can apply for funding under the European funds and programs or attract funds from external sources; • Improvement of the production	• Existence of political risk; • Low level of remuneration and living standard; • Lack of medium and / or large production enterprises in the cross-border area; • Shortage of management and expert staff; • Low level of competitiveness of the farmers and businesses in the cross-border region; • Poor financial condition of the farmers on the territory of the region; • Inability to provide bank financing due to lack of collateral; • Lack of administrative and financial capacity to apply for funding under European funds and programs; • Risk of depopulation of some settlements due to lack of prospects for personal and professional development of the inhabitants; • Unpredictability of climatic conditions; • Lack of funds for insurance of arable land; • Risk of mass bankruptcy due to lack of working capital;

SWOT ANALYSIS OF THE CROSS-BORDER REGION – BLAGOEVGRAD DISTRICT AND EAST PLANNING REGION	
technologies in agriculture, creation and increase of added value; • Organization and conduct of more forums and initiatives involving representatives of the central authorities, regional authorities, local authorities and the businesses across the cross-border region to promote the development of business endeavors; • Encouraging the construction of installations for the production of electricity from biomass; • Increasing the diversification of the produced agricultural production and in particular - organic farming; • Establishment of cross-border exchanges and markets; • Providing technical assistance when business representatives and / or agricultural producers apply for funding under European funds and programs; • Improving energy efficiency in residential buildings, administrative buildings, state and public property, using the accumulated experience and practices of the implemented programs and plans in the Republic of Bulgaria and the Republic of Macedonia in this field; • Conducting targeted policies to replace the fuel base in single-family residential buildings in the cross-border area.	• Loss of traditional markets; • Negative environmental impacts due to low use of energy efficient technologies; • Existence of many hotels in some settlements and the territories near them, risk of overbuilding; • Unbalanced development of the territory within the cross-border region;

These strengths and weaknesses, opportunities and threats for the cross-border region are the basis for formulating the strategic objectives of this document.

III. FORMULATION OF THE VISION FOR DEVELOPMENT OF THE CROSS-BORDER REGION

The main focus of the vision for the development of the cross-border region is on the social, economic and energy capacities.
The current energy strategy is aimed at overcoming the main challenges facing Bulgarian and Macedonian energy sector at present, as follows:

- Energy-intensive production: there is a great potential for optimizing the energy costs of business organizations, incl. farmers, on the territory of Blagoevgrad region and the East planning region;
- Imports of energy raw materials - there is a high dependence on imports of energy raw materials such as natural gas and crude oil in the cross-border region;
- Achieving a sustainable ecological balance - the use of liquid and solid fuels, based on petroleum products and coal, leads to significant emissions of harmful substances that pose a threat to the environment.

In connection with the above, we offer the following vision for the development of the Regional Energy Strategy: **Sustainable energy development, modern and competitive business environment and enhanced quality of life in the cross-border region - Blagoevgrad (Bulgaria) and the East planning region (Republic of Macedonia), by reducing the consumption of energy in the public and private sectors and optimal use of the available renewable energy sources potential with minimal negative impact on the environment.**

The proposed vision for development includes the defined objectives and priorities in the field of energy, determined by the European Union and the governments of the Republic of Bulgaria and the Republic of Macedonia, while stressing the need to preserve the environment and to achieve a sustainable growth.

The structure and content of this document follow the basic principles of strategic planning defined in the national methodologies and guidelines for developing such type of documents.

In the process of drafting the document, high priority is given to:

- Establishment of partnership between all institutions, stakeholders and civil society structures in the process of formulating and implementing the strategic intentions set out in the document.
- Coordination and close co-operation within and between stakeholders at all levels to achieve the expected results of policy-making and the measures planned for their implementation, of the cross-border region towards the end of the action period – 2023.

- Combining all efforts to make effective use of the material, human and financial resources to achieve the objectives set out in the Strategy;
- Achieving a synergic positive effect by implementing the measures set out in this document to achieve maximum socio-economic impact;
- Applying a flexible approach that allows upgrading, additions or alterations of the strategic objectives according to the conditions of the environment in which the strategy is implemented;
- Compliance with the principle of continuity, allowing consistent implementation of the set indicators and expected results in the policy making process.

IV. DEFINING STRATEGIC OBJECTIVES AND PRIORITIES

The strategic objectives are subordinated, on a vertical level, to the identified European and national (Republic of Bulgaria and Republic of Macedonia) priorities in the field of energy, the analysis of the socio-economic profile of the cross-border region and the results of the SWOT analysis.

Priorities are defined in accordance with the principle of independence, in relation to the respective strategic objective and depending on the need for interventions in a given sphere.

The following two tables contain information on vertical alignment with the identified objectives and priorities in the Regional Energy Strategy in accordance with the European and national strategy documents operating in the Republic of Bulgaria and the Republic of Macedonia as follows:

Table 11

Priority for the development of the cross-border region	Development priority according to European strategy papers	Development priorities according to national strategy papers
I. Increase of energy savings	**European Energy Strategy 2011-2020** Priority 10: Increase of energy savings and energy efficiency in the industrial, construction and transport sectors and achieve a 20% drop in overall consumption over the next ten years with the single energy savings objective for all member states.	**National Development Program: Bulgaria 2020** Priority 7: Energy security and increase of the resource efficiency. **National Energy Strategy of the Republic of Bulgaria by 2020** Goal: Bulgaria to reduce its GDP energy intensity with

Priority for the development of the cross-border region	Development priority according to European strategy papers	Development priorities according to national strategy papers
		50% by 2020 compared to its level in 2005. **Energy development strategy of the Republic of Macedonia by 2030** Priority 2: Improving energy efficiency in the production, transmission and use of energy.
II. Increase of energy efficiency	**European Energy Strategy 2011-2020** Priority 10: Increase of energy savings and energy efficiency in the industrial, construction and transport sectors and achieve a 20% drop in overall consumption over the next ten years with the single energy savings objective for all member states.	**National Development Program: Bulgaria 2020** Priority 7: Energy security and increase of the resource efficiency. **National Energy Strategy by 2020** Goal: Bulgaria to reduce its GDP energy intensity with 50% by 2020 compared to its level in 2005. Goal: To improve energy efficiency by 25% **National Energy Efficiency Action Plan 2014-2020** Goal: Energy savings in Final Energy Consumption - 716 ktoe / year and in Primary Energy Consumption - 1 590 ktoe / year. **Energy development strategy of the Republic of Macedonia by 2030** Priority 2: Improving energy efficiency in the production, transmission and use of

Priority for the development of the cross-border region	Development priority according to European strategy papers	Development priorities according to national strategy papers
		energy. **National Energy Efficiency Program in Public Buildings in the Republic of Macedonia 2012-2018** Goal: To provide investment to contribute to reducing energy consumption in Macedonia by at least 9% by 2018 compared to average energy consumption in the period 2002-2006.
III. High level of security of energy supply	**European Energy Strategy 2011-2020** Priority 11: Modernization of electricity grids and adoption of a regulatory and financial framework to support the increase of "smart" grids capacity and to promote energy saving, which will enable optimal use of renewable and decentralized energy production as well as combined production of heat energy and electricity; Priority 12: Development of a program for renovation, aimed at energy saving for the entire housing stock.	**National Development Program: Bulgaria 2020** Priority 7: Energy security and increase of the resource efficiency. **Energy development strategy of the Republic of Macedonia by 2030** Priority 1: Rehabilitation, renovation and modernization of the existing infrastructure and construction of a new, modern infrastructure for the needs of energy production and use.
IV. Modern, energy efficient and environmentally friendly	**European Energy Strategy 2011-2020** Priority 10: Increase of energy	**National Development Program: Bulgaria 2020** Priority 8: Improving

Priority for the development of the cross-border region	Development priority according to European strategy papers	Development priorities according to national strategy papers
transport	savings and energy efficiency in the industrial, construction and transport sectors and achieve a 20% drop in overall consumption over the next ten years with the single energy savings objective for all member states.	transport connectivity and access to markets. **Energy development strategy of the Republic of Macedonia by 2030** Priority 1: Rehabilitation, renovation and modernization of the existing infrastructure and construction of a new, modern infrastructure for the needs of energy production and use.
V. Sustainable Ecological Development	**European Energy Strategy 2011-2020** Priority 10: Increase of energy savings and energy efficiency in the industrial, construction and transport sectors and achieve a 20% drop in overall consumption over the next ten years with the single energy savings objective for all member states.	**National Development Program: Bulgaria 2020** Priority 5: Support of innovation and investment activities to increase the competitiveness of the economy. **National Energy Strategy of the Republic of Bulgaria by 2020** Goal: To increase the share of renewable energy sources in total final energy consumption. **Energy development strategy of the Republic of Macedonia by 2030** Priority 4: Increase of the use of renewable energy sources

Table 12

Strategic goal	Priority	Specific goal
I. Reduction of energy intensity of enterprises	1. Increase of energy savings	1.1.Improving the energy intensity of the small and medium-sized enterprises in the fields of industry, agriculture, services and transport
II. Reduction of energy consumption in public buildings, education, health, administrative and residential buildings	2. Increase of energy efficiency	2.1. Increasing energy efficiency in the public sector
		2.2. Increasing energy efficiency in residential buildings
III. Improvement of energy infrastructure	3. High level of security of the energy supply	3.1. 100% energy provision of the population and the business; 3.2. High quality of the services offered; 3.3. Reducing response time when an accident occurs.
IV. Improvement of transport infrastructure	4. Modern, energy efficient and environmentally friendly transport	4.1. Increasing the share of vehicles using alternative energy carrier 4.2. Improving the efficiency of public transport; 4.3. Reducing travel time.
V. Utilization of the potential for renewable energy production on the territory of the cross-border region	5. Sustainable ecological development	5.1. Limiting the emission of harmful substances; 5.2. Increasing the share of renewable energy in the public sector; 5.3. Increasing the share of renewable energy in the private sector; 5.4. Increase of the clean technology share; 5.5. Increasing the share of biofuels produced from biomass; 5.6. Reducing the share of energy from solid and liquid

Strategic goal	Priority	Specific goal
		fuels.

The implementation of the set goals and priorities will contribute to raising the living standard and the quality of life of the population in the cross-border region with minimal negative impact on the environment.

V. ACTIVITIES AND MEASURES

The Strategy focuses on energy efficiency, energy and transport infrastructures and the utilization of renewable energy potential for the following reasons:

- The implementation of energy efficiency measures will have a positive impact in several ways: reducing energy costs, improving the financial condition of the budgets of the municipal administrations within the scope of the cross-border region and of the small and medium enterprises in the fields of industry, agriculture, services and transport, carrying out technological modernization, improving the comfort of habitat in buildings, reducing emissions into the atmosphere, improving the quality of life in one family residential buildings by replacing the fuel base;
- The improvement of the technical characteristics and expanding the energy infrastructure will have a positive effect on the population and the business by improving the quality of the same, which will ensure the continuity of the power supply, remote control and timely response to emergency situations;
- Improving the transport infrastructure will increase security and optimize travel time, reduce environmental pollution, contribute to refurbishment of the vehicles and improve travel comfort;
    - The utilization of the renewable energy production potential will have positive effects in several directions: optimization of production costs, protection of the environment, possibility of realization of additional revenues from electricity sales, improvement of competitiveness.

1. Reducing the energy intensity of enterprises

Measure No1 Promotion of energy audit in SMEs in industry, agriculture, services and transport

The measure aims at encouraging SMEs in the field of industry, agriculture, services and transport, operating in the territory of the cross-border region, to optimize energy consumption by conducting energy audits of business and industrial buildings.

Measure №2 Promotion of the increase of energy efficiency in small and medium enterprises in the sphere of industry, agriculture, services and transport

Based on the prepared energy audit reports, optimal packages of energy saving measures should be selected and applied that will contribute to the reduction of the harmful emissions and improvement of the energy characteristics in the respective sites.

Measure №3 Technological modernization of agricultural farms

Improving the competitiveness of farms in the cross-border region by introducing modern innovative production technologies, optimizing the main production costs, improving productivity, introducing quality management systems, renewing farm machinery, etc. The deployment and use of new technologies will limit the negative impact on the environment.

2. Reduction of energy consumption in the public buildings, buildings of education, healthcare, administrative governance and residential buildings

Measure №1 Accomplishment of an energy audit in public buildings on the territory of the cross-border region.

- Performing an energy audit of 4 (four) administrative buildings on the territory of Blagoevgrad District and 4 (four) administrative buildings on the territory of the East planning region.

The measure will allow the identification of means to optimize the energy performance of the above-mentioned administrative buildings, which will contribute to improving the comfort and reducing the energy consumption in them.

The implementation of the measure will encourage the energy audit of buildings, state or municipal property. Specific energy efficiency measures will be identified in the reports, including but not limited to: replacement of window frames, rehabilitation of walls, roofs, ceilings and floors to reduce heat losses, replacement of heating appliances and replacement of installations for power supply, water supply and heating.

The selection of sites was carried out on the basis of an assessment of the potential for implementation of energy efficiency and renewable energy measures on 4 (four) buildings on the territory of the Blagoevgrad District and 4 (four) buildings on the territory of the East planning region in the Republic of Macedonia.

The following activities have been performed during the assessment process:

- Analysis of the state of the site - climate data, description of the building, description of the enclosures, energy supply and consumers, energy consumption analysis;
- Model study of the building - general data on the building, reference to the building year of construction, standard at the time of the survey, surounding elements on facades, roofs and floors, general performance of the building, heating, ventilation, domestic hot water, fans, pumps and lighting, other elements impacting and not impacting on the balance, budget "energy consumption", power budget;

- Energy saving measures - specific energy saving measures are proposed to improve the operational and energy performance depending on the assessment of the actual results of the site;
- Energy class of the building.

Description of the sites

As a result of the inspection, the following sites were identified for which energy efficiency measures should be implemented, as follows:

Information about the facility	**Description**
Administrative building of the Regional Inspectorate for Environment and Water - Blagoevgrad	
Address	Republic of Bulgaria, Blagoevgrad District, Municipality of Blagoevgrad, Blagoevgrad, 1, Svoboda Str
Short description of the building	The building was built in 1978 with a total area of 5 304 sq. m. RIEW - Blagoevgrad is the owner of 1/10 of the whole building since 1999. The Regional Inspectorate of Environment and Waters - Blagoevgrad uses 611 sq. M of built-up area on the first floor of the building. The facility is used as an administrative building, it has a separate entrance / exit. The heating of the floor is done only by electricity and local heating (each working room has a separate heater).
Repair activities up to now	In 2000, the part owned by the RIEW - Blagoevgrad was repaired. The window frames were replaced, the premises were rebuilt from laboratories in offices. The flooring was renewed and the walls were painted. In 2016, the workrooms were painted.
Year of construction	1978
Built area	611 sq.m
Extended built-up area	611 sq.m
Heating source 1	Electric heaters

Information about the facility	**Description**
Heating source 2	Air conditioners
Other heating source	Not applicable
Eligible activities	Measures to improve energy efficiency: • Thermal insulation of walls; • Thermal insulation of roofs; • Replacement of heating instalation; • Replacement of air conditioning; • Replacement of lamps.
Administrative building of the "Employment Agency", the "Regional Employment Service Directorate" and the "Labor Office Directorate"	
Address	Republic of Bulgaria, Blagoevgrad District, Municipality of Blagoevgrad, Blagoevgrad, 58, Ivan Mihailov Str.
Short description of the building	Administrative building with identifier №04279.602.103.1 on four floors, massive construction, built in 1963, reconstructed in 1998. The roof of the building is flat, covered with bituminous tiles, everywhere with installed aluminum joinery. The walls in the work rooms are brickwork, plasterboard with plaster and painted with latex. For the needs of the heating system, aluminum radiators are installed. The purpose of the building is performance of business and administrative activities.
Repair activities up to now	Executed construction works on the first and second floor, owned by the Employment Agency, financed under the Operational Programme "Regional Development". On the first floor of the building were separated premises for security, information, archive, registration zone, labor mediation, warehouse, sanitary premises. Construction works were carried out, including the demolition of some of the existing walls and the construction of new ones. New and existing walls were plastered and painted. There was a partial replacement of the joinery with an aluminum one and the suspended ceiling was completely replaced. New lighting fixtures were installed, on

Information about the facility	**Description**
	the first and the second floor the sanitary units were repaired, as amortized water and sewerage installations were replaced , new floorings, floor siphons, toilet seats and sinks were installed. The walls on the second floor were painted, cable and bridge cables were laid and switch off sockets were installed for a hidden installation for the two floors. The lighting in the corridor of the second floor were replaced.
Year of construction	1963, rehabilitated in1998
Built area	356 sq.m
Extended built-up area	1 144 sq.m
Heating source 1	
Heating source 2	
Other heating source	Heating hot water fired boiler using diesel fuel
Eligible activities	Measures to improve energy efficiency: • Thermal insulation of walls; • Thermal insulation of floors; • Thermal insulation of roofs; • Replacement of external joinery; • Replacement of heating source / fuel; • Replacement of heating installation; • Replacement of lamps
Administrative building of Rila National Park Directorate, The Ministry of Environment and Water	
Address	Republic of Bulgaria, Blagoevgrad District, Municipality of Blagoevgrad, Blagoevgrad, 12, Bistritsa Str.
Short description of the building	The administrative building of Rila National Park Directorate, MOEW is a massive two-storey building with a heated basement, partially dug into the adjacent terrain to the north and

Information about the facility	**Description**
	east. The building is solid, monolithic with stone walls on the first floor and walls of lattice brick 25 cm thick on the second floor, wooden top structure - roof covered with single-sided tiles and monolithic reinforced concrete slabs. The building is designed for administrative activities
Repair activities up to now	Not applicable
Year of construction	1980
Built area	106,62 sq.m
Extended built-up area	266,08 sq.m
Heating source 1	Hot water boilers KB-H 350 using natural gas as fuel
Heating source 2	Room air conditioners, electric convectors, fan heating appliances, etc.
Other heating source	Electric boilers 2 kW
Eligible activities	Measures to improve energy efficiency: • Insulation of external walls; • Replacement of joinery; • Others - air conditioners
Administrative building of "Regional Forest Directorate"	
Address	Republic of Bulgaria, Blagoevgrad District, Municipality of Blagoevgrad, Blagoevgrad, 2, Vasil Koritarov Str.
Short description of the building	Administrative Building - IVth category. The building consists of a basement, ground floor, three floors and a ceiling. The walls are lattice bricks, double-sided plastered. The facades on the street are stone-lined, and plastered on the inside. The ceiling is made of copper sheet with heat insulation. The basement in the building is unheated. The heating and cooling of the building is done with a pellet boiler and air conditioners. The ventilation is natural. Warm water is boiled by electric

Information about the facility	Description
	boilers.
Repair activities up to now	In 2007, the window frames of the 2nd and 3rd floor were changed from aluminum-based to wooden-paneled glass, which are currently amortized. In 2012, a boiler for oil heating was replaced, with a pellet heating boiler.
Year of construction	1960
Built area	446,23 sq.m
Extended built-up area	1482,67 sq.m
Heating source 1	Air-conditioners
Heating source 2	Boiler on pellets
Other heating source	
Eligible activities	Measures to improve energy efficiency: • Replacement of external joinery; • Replacement of heat source / fuel; • Replacement of heating installation; • Instruments for measurement, control and management of energy consumption; • Replacement of lamps.
Administrative building of the General municipal school "Vanko Parke"	
Address	Macedonia, East planning region, Shtip municipality, 66 Vassil Glavinov Str.
Short description of the building	The building was built in 1962, it has a ground floor and two floors as a mansard. The construction is highly amortized and many problems are observed. The roof structure is worn out and water is collected during rainfall entering the study rooms. The EMO 500 boiler is 22 years old and due to frequent repairs it needs urgent replacement. The radiators in the classrooms are old since the school was built, the heating is bad. In view of the

Information about the facility	**Description**
	above, implementing energy efficiency measures through a thermal insulating façade will contribute to the saving of heat and thus reduce the heating costs. The electrical installation is damaged and often breaks down. The installation can not withstand more tension and load and therefore the fuses break out. The floor of the school building is damaged and often leads to injury to students from unevenly located slabs.
Repair activities up to now	Not applicable
Year of construction	1962
Built area	4170 sq.m
Extended built-up area	8622 sq.m
Heating source 1	Oil heater
Heating source 2	
Other heating source	
Eligible activities	Measures to improve energy efficiency: • Thermal insulation of walls; • Thermal insulation of floors; • Thermal insulation of roofs; • Replacement of external joinery; • Replacement of heat source / fuel; • Replacement of heating system; • Heat pump installations; • Replacement of lamps
Administrative building of the General municipal school "Nikola Karev"	
Address	Macedonia, East planning region, Probishtip municipality,

Information about the facility	**Description**
	Probishtip, 66, Velko Vlahovik Str.
Short description of the building	The facility of the general school "Nikola Karev" - Probishtip is intended for basic education and as such it accommodates the students, the employees, the equipment and the means necessary for carrying out the activity. For vertical communication, the level of the building has a two-sided skeleton column leading from the first floor to the first or second floor. There are two pools in the building. The classroom is built into two separate spheres - a class and a subject. It has an administrative part, a sports hall and an indoor swimming pool and between the classroom and the administrative part there is a horizontal connection - corridors. The building is built of reinforced construction and brick partition walls. The roof structure of the building is made of wooden elements (beams, boards and slats) and the roofing is made of aluminum sheet. The entrance doors are metal, the windows are PVC and the rest are metal, and the inner doors are metal and they are made of wood. The partition walls are made of bricks. Thr radiators in the school building are obsolete. The floors are covered with viniflex (PVC), granite tiles and ceramic tiles. The facility is supplied with electricity from the local power grid. It has an electrical installation that complies with the standards for these type of facilities. For the full power supply of the school building, there is a main electrical switchboard with a main switch located on the ground floor of the building. The heating of the facility is provided by its own installation using combined wood, oil and coal. The school has its own

Information about the facility	**Description**
	liquid fuel tank with a 50-tonne cubicle dug in the schoolyard. The warehouses for wood and oil are located in the building itself. The water supply of the building is accomplished by the local water supply network.
Repair activities up to now	Replacement of part of the windows in the school building - from the budget of the Republic of Macedonia - 2015 Reconstruction of the swimming pool in 2017 – the budget of the Republic of Macedonia Reconstruction of sports grounds in 2017 - the budget of the Republic of Macedonia
Year of construction	1968
Built area	7263 sq.m
Extended built-up area	22531 sq.m
Heating source 1	Boiler using oil
Heating source 2	Boiler using wood
Other heating source	Boiler using coal
Eligible activities	Measures to improve energy efficiency: • Thermal insulation of walls; • Thermal insulation of floors; • Thermal insulation of roofs; • Replacement of external joinery; • Replacement of heating source / fuel; • Replacement of heating installation; • Replacement of ventilation system; • Replacement of air conditioning; • Instruments for measuring, control and managing energy

Information about the facility	**Description**
	consumption; • Solar installations for domestic hot water; • Heat pump installations; • Replacement of lamps.
Administrative building of the Secondary School "Metodi Mitevski - Britso "	
Address	Macedonia, East planning region, Delchevo municipality, Delchevo, 35, Metodi Mitevski-Britso Blvd.
Short description of the building	The building was built in 1961. The outer walls are made of bricks, the facade is damaged. On the ground floor of the school there are: workshops, paintings, archives, heating, high school, offices and library. The roof, ceiling and roof insulation are made of tile, roof / reed / plaster. The heating system is an individual central system that uses fuel oil. Almost the whole ground floor has moisture on the outer walls. A school building project under the IPA program was completed in the period from 31 July 2014 to 31 May 2016, during which the construction of four standard classrooms and two smaller classrooms was completed.
Repair activities up to now	A renovation was completed in 2008/09 (replacement of beamwork and roof structures). Repair of the school building in 2016
Year of construction	1961
Built area	3844 sq.m
Extended built-up area	3943 sq.m
Heating source 1	Boiler using oil
Heating source 2	
Other heating source	
Eligible activities	Measures to improve energy efficiency:

Information about the facility	**Description**
	• Thermal insulation of walls; • Thermal insulation of floors; • Thermal insulation of roofs; • Replacement of external joinery; • Replacement of heating source / fuel; • Replacement of heating system; • Heat pump installations; • Replacement of lamps.
Administrative building of the General secondary School "Aco Ruskovski-Berovo"	
Address	Macedonia, East planning region, Berovo municipality, Berovo, 66, Dame Gruev Str.
Short description of the building	The building of the school has an area of 3448 sq.m. The building structure is solid, the roof of the school is made of sheet metal. The school has no basements, there is a boiler room, a hiding place and
	others. The heating of the building is provided with a wooden boiler.
Repair activities up to now	A reconstruction of the roof was completed in 2014.
Year of construction	1998
Built area	3448 sq.m
Extended built-up area	5000 sq.m
Heating source 1	Boiler using oil
Heating source 2	Boiler using wood

Information about the facility	Description
Other heating source	
Eligible activities	Measures to improve energy efficiency: • Thermal insulation of walls; • Replacement of heating system; • Instruments for measuring, control and managing energy consumption; • Replacement of lamps.

The implementation of the energy efficiency measures in the 8 buildings in the cross-border region will contribute to reducing the emission of harmful substances in the atmosphere and optimizing the energy consumption of the facilities. All of this will have a positive impact on the environment and will contribute to the implementation of the strategic objectives of the funding program in this area.

Measure №2 Implementation of energy efficiency measures in the public buildings based on the prepared energy reports:

- Implementation of energy efficiency measures in 4 (four) administrative buildings on the territory of Blagoevgrad district and 4 (four) administrative buildings on the territory of the East planning region.

The prepared energy audit reports will identify the main issues and the proposed solutions (energy efficiency measures) that will have the maximum positive effect on the above described facilities.

Measure 3 Improvement of energy efficiency in regards to the lighting in the public buildings

One of the main goals of the measure is to improve the efficiency of lighting in the public buildings by reviewing and evaluating the current situation, replacing lighting units with energy-saving ones and compact fluorescent lamps. Introducing modern light management systems to allow quick and easy handling.

Measure 4 Improve energy efficiency in street lighting

The significant financial effect that street lighting has on the local government budgets and its undoubted public benefits are the main reasons for taking measures aimed at improving the quality and optimizing the energy consumption of the same. In this respect, the measure aims to improve the energy efficiency and modernize the street lighting by applying modern

management systems based on the best practices from identical projects and replacing lighting fixtures if necessary.

Measure №5 Energy auditing carried out in residential buildings

The measure aims at conducting energy audits of residential buildings on the territory of the cross-border region to identify their current situation, which buildings are priority, what are the most appropriate measures to improve their energy performance and comfort, what will be the mechanisms for implementation of these actions.

We clarify that single-family and multifamily buildings fall into the range of the residential buildings. The argument for the inclusion of single-family residential buildings is that they are a major pollutant, as most of these buildings are heated on wood and coal, resulting in significant amounts of harmful substances being emitted into the atmosphere.

It should be noted that the experience of the Republic of Bulgaria in implementing the National Energy Efficiency Program for Multifamily Residential Buildings can be used in the process of preparing the relevant action plan.

Measure 6 Implementation of energy efficiency measures in residential buildings

The energy audit reports will be the basis on which the energy efficiency measures with the most positive effect will be determined. Applying the prescriptions in the reports to each site or group of sites will be accomplished through an action plan containing the main activities, deadlines and responsibilities. The reports will include information on the proposed new energy-saving high-performance building materials and insulation technologies, during new construction, renovation of an existing building stock, and renovation of water and energy distribution and supply facilities.

According to the legislation in force, an energy passport is issued for each building when it is a new construction or reconstruction, basic renovation and overhaul, in accordance with the technical requirements and the methods for determining the consumption for heating.

In addition, we plan to raise the public awareness about the financial mechanisms, advantages and benefits that citizens will be entitled to after implementing the energy efficiency measures.

Improving the energy performance of residential buildings will reduce the heat loss, increase the performance of the dwellings and increase the comfort.

3. Improvement of the energy infrastructure

The investiment in improving and expanding the energy infrastructure is a key priority of the European energy policy.

Measure №1 Modernization and expansion of the energy infrastructure

The main objective of the measure is to invest in the maintenance and expansion of the energy infrastructure to improve the network's performance, to achieve connectivity of the population and the business and to ensure that 100% of these users are provided with the necessary amount of energy.

Measure №2 Modernization and expansion of the gas transmission network

The measure is aimed at making investments to improve the performance and deploy modern network management systems. A large part of the settlements in the cross-border region are not gasified, so the respective investment intentions for their accession will be identified. The use of this type of energy source by the population and business will have a positive effect on the environment.

4. Improvement of the transport infrastructure

The transport sector is one of the main environmental pollutants and it is of major importance to the population. With this in mind, the efforts by local and regional authorities should be aimed at improving the quality and efficiency of the service. In this regard, we intend the following specific measures:

Measure №1 Realization of investments for the purchase of new transport vehicles meeting the modern environmental standards

The realization of investments to replace the fleet are a key factor to achieving a high quality transport service. The use of new, greener, more energy efficient and lower fuel-consuming vehicles will greatly enhance the comfort during the journey. The overall improvement of the service (speed, better service and better comfort) will increase the passenger number, the financial revenues and increase the image of the transport operator to the Contracting authority, the central authorities, the public and the business.

Measure № 2 Development of alternative routes for travelling

Reducing the travel time on the route is a must for anyone using public transport. In view of this, the measure aims at analyzing the transport schemes in the settlements, assessing their effectiveness and proposing alternative options to satisfy all stakeholders - operator, user and Contracting Authority.

5. Utilization of the potential for renewable energy production on the territory of the cross-border region

Within the above-written objective, specific measures are forecasted as follows:

Measure No. 1 Promoting the use of technologies based on renewable energy sources in the public sector

The goal of the measure is to introduce energy-efficient technologies in the public sector, incl. replacement of the fuel base of the administrative buildings with technologies based on renewable energy sources - solar collectors for the provision of domestic heating, photovoltaic panels of roofs and facades for electricity production for own needs, development and implementation of measures for introduction of hybrid street lighting.

Transition to the use of renewable energy will greatly minimize negative environmental impacts, improve quality of life and optimize budgets.

Measure No. 2 Promoting the use of renewable energy sources in the private sector

The introduction of renewable energy technologies in the households will reduce the energy consumption, increase comfort in the dwelling, reduce the emission of harmful substances in the atmosphere, contribute to the stabilization of personal finances.

The achievement of the expected results will be accomplished with the support of the local and regional authorities by organizing and conducting information campaigns to promote the use of renewable energy in private residential buildings - natural gas, biomass, solar energy - solar collectors and photoelectric installations, establishment of a consultative mechanism for technical assistance for realization of projects for utilization of the potential of renewable sources, development and implementation of efficient information models for the popularization of the European, national and local legislation on renewable energy sources.

Measure No. 3 Supporting the business for the use of renewable energy technologies

The introduction of modern renewable energy sources technologies from the businesses will have a positive overall impact on the economy and the population in the cross-border region as the main source of income is the jobs provided by the respective entrepreneurs. Optimizing the main costs of production contributes to improving competitiveness, which is key factor to maintaining and / or expanding the market share.

Securing energy needs through renewable energy sources creates the opportunity to sell surplus quantities produced, ie. make additional revenue.

In this regard, actual ideas are the use of high-efficiency biomass heating systems in small and medium-sized enterprises, creating partnerships to develop and implement a system of counseling services for small and medium-sized enterprises to introduce energy efficiency packages and energy recovery from renewable sources, development of public-private partnership mechanisms for the construction of renewable energy installations on the territory of the cross-border region.

The intended activities and measures within the Regional Energy Strategy will contribute to the fulfillment of the European and national energy goals.

VI. MONITORING AND CONTROL

Monitoring and control are an integral part of the overall process of public policy implementation. They must ensure the effective and efficient implementation of the different sectoral and thematic development policies conducted by the regional and local authorities, to help achieve the expected results and to ensure wide public access to them.

In the monitoring process, quantitative and qualitative data will be collected on the implementation of the relevant policies and measures in order to assess the progress made by comparing the baseline with the achievements. The aim is to supervise the process and if needed to take timely corrective actions in order to improve the further development of the implementation process.

The monitoring and control of the implementation of the energy strategy will be carried out by a regional energy council including representatives of the Blagoevgrad district and the East planning region. The elected officials will have the obligation to prepare and present information on the implemented activities and measures regarding the set goals and priorities to the relevant energy authorities in Bulgaria and Macedonia.

Monitoring allows the competent local and regional authorities to be provided with early information on the progress or lack thereof in line with what is planned and has an important role to play in medium and long-term policies and programs that take place over several phases of time, relate to different sectors and affect different territories and populations. Undoubtedly, the duration of time affects the degree of uncertainty in the implementation of the relevant policies, activities and measures.

It is the duty of these officials to produce at least one interim report in the current year on the progress made and an annual activity report. The latter will contain a summary of the achievements during the year over strategic and specific objectives and priorities, common problems and the solutions chosen to overcome them as well as additional information.

The report will be accompanied by a table containing information on the implemented measures in accordance with the objectives and priorities set out below:

Implemented activites/measures in 20..

Strategic goal	Priority	Specific goal	The name of the acvtivity/measure	Indicators		Results	Financial resourses
				Quantitative	Quality		

The annual report on the monitoring of the implementation of Regional Energy Strategy should have the following structure and content:

- General conditions for the implementation of the Strategy and in particular the changes in the socio-economic conditions in the cross-border region;
- Progress made in meeting the objectives and priorities of the Regional Energy Strategy;
- Actions taken to ensure efficiency and effectiveness in the implementation of the Regional Energy Strategy;
- Conclusions and suggestions to improve the monitoring results.

VII. SOURCES OF FINANCING

The projects in the field of energy efficiency and renewable energy require a significant amount of financial resources. In the process of structuring the relevant project budgets, the balance between the available resource and the one to be attracted by donor organizations and banks should be determined.

In the process of implementing the Regional Energy Strategy, funding can be sought from the following sources:

- *Funds from the state budgets of the Republic of Bulgaria and the Republic of Macedonia*

Pursuant to the requirements set out in the Energy Efficiency Act of the Republic of Bulgaria and the Republic of Macedonia for the implementation of the activities and measures laid down in the regional plans and programs for energy efficiency and renewable energy sources compiled annually by the central executive authorities and the regional governors and other state bodies, funds from the state budget are foreseen.

In the case of mixed property (state and municipal), the funds provided by the state budget can be declared through the budgets of the respective state body, proportionate to their shares.

- *Budget funds of the municipalities in the cross-border region*

The EE and renewable energy sources legislation of the Republic of Bulgaria and the Republic of Macedonia defines an important role for municipalities in the Blagoevgrad region and the East planning region due to the fact that they are obliged to have developed plans and programs in EE and renewable energy sources and to submit annual reports on their implementation. At the same time, the local authorities lack the necessary financial resources to implement the identified projects.

Despite the scarce financial resources of the municipalities, provision should be made in the annual budgets for EE and renewable energy sources activities.

- *Own funds of enterprises*

There is a change in the entrepreneurs' thinking about the key role of EE and renewable energy technologies to improve firms' competitiveness by reducing energy consumption and improving the quality of local industrial production, taking into account the levels achieved by other European producers.

The possible sources of funding for renewable energy sources and EE projects for the private business are the European funds and preferential credits.

Most of the external sources require the investor to provide about 50% of their own participation to implement the project. In view of this, it is necessary, if possible, to form cash reserves that to be provided in the form of own contribution in future investment projects.

The main problem in the specific situation is that a large part of the SMEs in the cross-border region are unable to accumulate additional financial resources because of the high level of energy costs and the low degree of technological modernization. In practice, these businesses have no access to external sources of funding such as grant schemes or bank loans.

- *Programs and funds*

The European policy encourages the identification and realization of renewable energy sources and EE projects, which is why there are funds and programs at national level that have high priority for such projects. It is necessary to identify and use the available funds and programs at EU level, in the Republic of Bulgaria and in the Republic of Macedonia.

We note that the second programming period 2014-2020 continues in the Republic of Bulgaria, and the Republic of Macedonia, as an EU candidate country, has access to the pre-accession programs of the European Community.

- *Contracts with guaranteed result*

An effective financial and technical model for implementing EE and RES projects is the use of ESCOs. The model finds practical application in the developed European countries, USA and Canada. This type of companies specialize in offering EE services to deliver energy savings. The necessary investment costs are covered by the annual savings and, in practice, relieve the contracting authorities concerned of planning their working capital.

- *Loans from commercial banks*

One of the key instruments for financing investment projects is and will remain the banking sector, despite the restrictive requirements and lending conditions.

- *Modern economic mechanisms*

Funding opportunities include concession contracts, venture capital funds, public-private partnership and joint venture.

VIII. RESULTS

The strategic results to be achieved with the implementation of the energy strategy can be summarized as follows:

- Energy savings

The implementation of measures to reduce the energy intensity of the enterprises will optimize the energy consumption and costs. The expected household, public and private sector savings can hardly be quantified for the cross-border region, but our assumptions are for an average of over 45% of the energy consumed by the present time.

- Protection of the environment

The introduction and use of high-tech equipment in enterprises, the implementation of energy efficiency measures in the households, public and private sectors, and the increase in the level of "energy culture" will significantly reduce the emission of harmful substances into the atmosphere, limit the negative environmental impact of human activity and preserve the plant and biological equilibrium. Protecting the environment is crucial for people's survival, given the climate change and sharp temperature surges in the recent years.

- Economy and population

Improving the technological modernization of the enterprises in the cross-border region will increase their competitiveness, market positions and financial sustainability. As a result, the entrepreneurs will have the opportunity to improve working conditions, index employees' salaries, plan future investment initiatives that will lead to new jobs. Raising living standards in the region will attract more population and will have a beneficial effect on the natural growth.

- Additional effects

The implementation of the Regional Energy Strtegy will contribute to delaying the process of exhausting the natural energy resources, increasing the competitiveness of enterprises, improving living conditions and standards of living, diversifying energy supplies and reducing the dependence of the facilities on fuel and energy prices in the cross-border region.

The identified objectives, measures and activities are in line with the European energy priorities, the specific cross-border issues and correspond to the current national energy strategies and policies. Their implementation will have a positive impact on the population, economy, energy infrastructure, the environment and will make the region a center of attraction for people and businesses.