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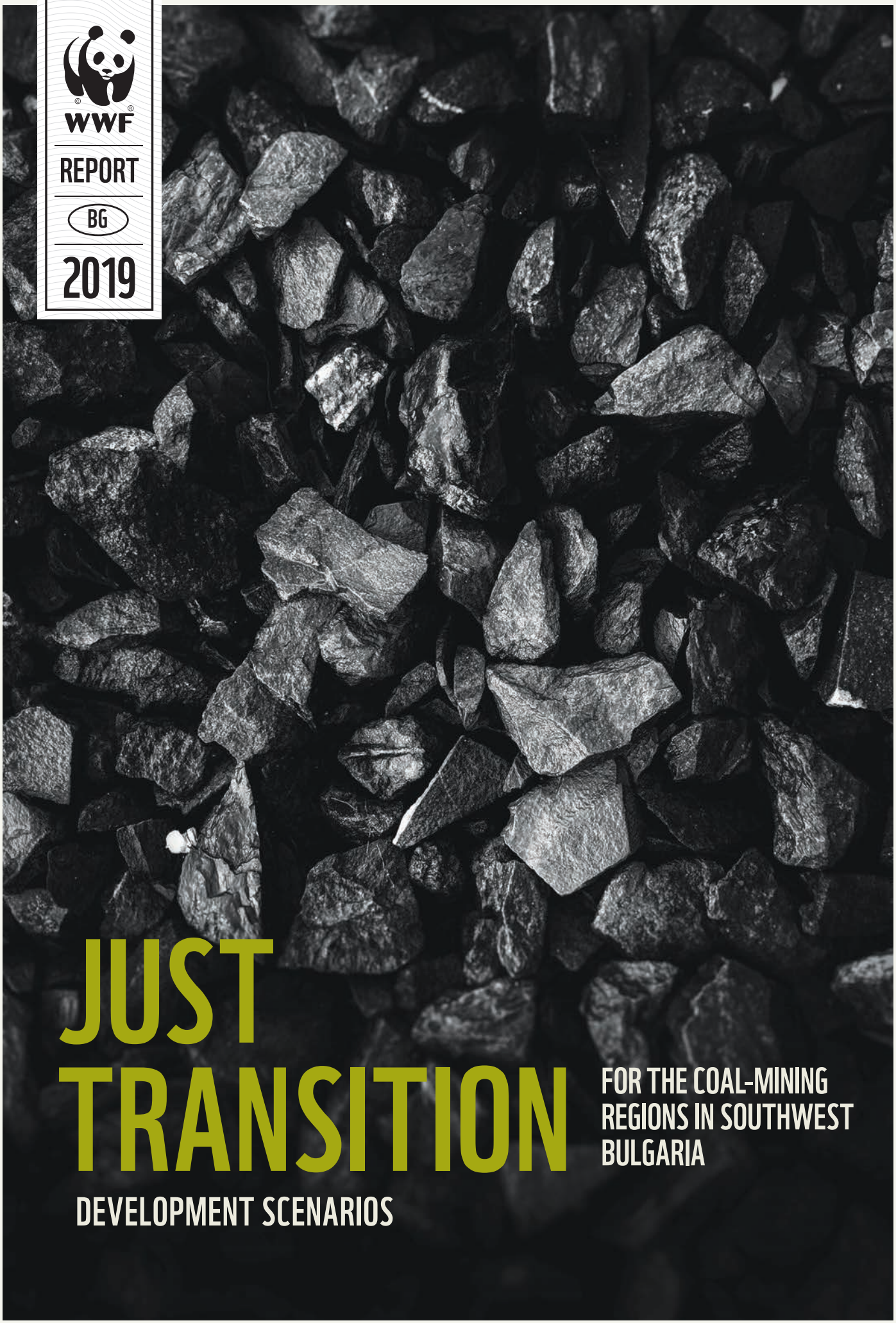

JUST TRANSITION

FOR THE COAL-MINING REGIONS IN SOUTHWEST BULGARIA

DEVELOPMENT SCENARIOS

JUST TRANSITION FOR THE COAL-MINING REGIONS IN SOUTHWEST BULGARIA
Development Scenarios
Summary report

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List of Abbreviations

NPP	Nuclear Power Plant
AMS	Automatic measuring systems
GDP	Gross Domestic Product
G	Grant
RES	Renewable energy sources
HPP	Hydro Power Plant
GWh	Giga watthour
DSSA	Dynamic Shift-Share analysis
VAT	Value Added Tax
EEC	European Economic Community
EC	European Commission
EU ETS	EU Emissions Trading Scheme
EU	European Union
FPP	Factory power plant
EEA	Executive Environment Agency
ICT	Information and Communication Technologies
AAQ	Ambient air quality
NACE	Classification of economic activities
KgOE	Kilogram(s) oil equivalent
CHH	Cultural and historical heritage
CITUB	Confederation of Independent Trade Unions in Bulgaria
LC	Labour Confederation (Podkrepa)
MWt	Megawatt tone
MoE	Ministry of Energy
MoEW	Ministry of Environment and Water
SMEs	Small and medium-sized enterprises
NEC	National Electric Company
NIHM	National Institute of Hydrology and Meteorology
R&D	Research and Development
NSI	National Statistical Institute
UN	United Nations
GWBs	Bodies of Groundwater
PHES	Pumped hydroelectric energy storage
FDI	Foreign direct investment
RIEW	Regional Inspectorate of Environment and Water
AAQAMA	Ambient Air Quality Assessment and Management Area
ADR	Average Daily Rate
QS	Quality Standards
TWh	Terawatt hour(s)
TPP	Thermal Power Plant (s)
TNC	Trans-national corporations
HPP (DHC)	Heat power plant (district heating company)
FPM	Fine particulate matter
SW	Southwest
SWR	Southwestern region
NUTS	Nomenclature des unités territoriales statistiques* – Nomenclature of Territorial Units for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization

* From French

SUMMARY

"No energy is as costly as the one that does not suffice"

Ghazi Baba
(Indian philosopher)

The transition to a low-carbon economy in Europe is no longer just an option. It is happening in practice and the processes of transformation in the energy sector have been going on for more than a decade. Society can choose whether to remain passive and resist transition, or be proactive and conduct policies to change the direction of economic development in the country.

Workers in the energy and coal industry and their trade unions face a serious challenge. On the one hand, they will have to take up much of the burden of the transition to a sustainable economy. A significant number of jobs will be transformed – a process that is already running due to the modernization and upgrading of current industrial technologies. On the other hand, trade unions as the driving force of social change have the best understanding of the potential and benefits of collective action. If they do not use their influence in the high carbon sectors to speed up and support the processes of modernization and upgrading during the transition to a low carbon economy, there is a risk many jobs to be closed down in the short-term. Now we are facing this problem in Southwest Bulgaria.

The concept of "just transition" enables the transition to a low-carbon economy in a responsible and accountable manner by caring for people who lose their income, especially workers in the energy and coal industry. The burden of the transition should be distributed between and within the affected countries and the guiding principles should be the responsibility and opportunities. Only in this way can be achieved a transition to sustainable economy that is just for both people and the environment.

Decarbonisation policies and measures may in fact become the driving force for sustainable economic growth and social progress. This can be done with the active participation of the employees and workers who are most directly affected. There are various alternatives that have been addressed in this study for achieving a just transition in Southwest Bulgaria. It outlines the possible scenarios for sustainable development beyond maintaining the current state (i.e. beyond the absence of concrete actions for change).

THE ANALYSIS PRESENTS SOLUTIONS TO THE PROBLEMS RELATED TO THE TRANSITION FROM COAL INDUSTRY TO A SUSTAINABLE ECONOMY IN SOUTHWEST BULGARIA.

The analysis presents solutions to the problems related to the transition from coal industry to a sustainable economy in Southwest Bulgaria. It is an attempt to plan the future of coal regions in Bulgaria and can serve as a tool for policy planning and long-term strategic decision making in this region.

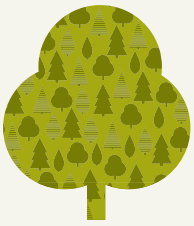
The geographical scope of the study covers the Southwest Planning Region. This scope covers the districts of Pernik, Kyustendil, Blagoevgrad and Sofia-district (NUTS II level without Sofia city). The sectoral scope of the analysis is the energy and coal industry whose territorial focus is located mainly in the municipalities of Bobov Dol (Bobovdol field) and Pernik (Pernik field), as well as the already non-operational Simitli (Pirin field) and Gotse Delchev (Kanina mine).

From an energy perspective, the total coal reserves in Bulgaria were estimated to be small. Lignite predominates in the reserves. On the territory of Southwest Bulgaria

is the “Struma Province” containing 85% of the brown coal deposits and reserves in Bulgaria. It includes the Bobovdol field, Pernik field and Pirin field. On the territory of Southwest Bulgaria, there are two TPPs, which are involved in the production of electricity. Closing down TPP Bobov Dol (Bobov Dol municipality and TPP Republika (Pernik municipality) will lead to the need for production of 903,781 MWh electricity annually from alternative sources.

From an economic perspective, the Southwest Region is the most developed region in the country compared to the other five. But this is due to the capital, which is also located here. This is not the case with the economic situation in the main areas and municipalities, on which this study focuses. A significant part of the territory has a depleting potential of energy carriers, which in the short- and medium-term will not allow the development of the energy sector. This requires a thorough rethinking of economic planning and development of all possible alternatives.

The demographic situation in the region of Southwest Bulgaria has a slightly better performance than other 5 regions of the country, but again this does not apply to the major coal regions on its territory. For example, in Kyustendil district, where the Bobovdol coal field is located, the population has decreased by 40% in less than two decades.



THE NATURAL CHARACTERISTICS ARE A PREREQUISITE FOR A SUSTAINABLE FUTURE.

The natural characteristics of Southwest Bulgaria are a prerequisite for a sustainable future. There are over 150 protected areas of all types, including two of the country’s three national parks: Rila Park (the largest in Bulgaria) and Pirin Park (under the protection of UNESCO). These conditions favour the development of various forms of tourism, organic farming, organic stock-breeding, sustainable forestry and fishing, while complying with the requirement that economic activities should be compatible with the conservation of valuable species, habitats and nature in general. This fact should be taken into account when deciding on investments in alternative economic activities in the region.

The study of the just transition of the coal-mining regions in Southwest Bulgaria is coordinated with various institutions and organizations affected by the problems of transition in the region, including local and regional authorities, trade unions, business, national institutions and the non-governmental sector.

The study examines the economic development opportunities covered in three scenarios, as follows:

The first scenario of maintaining the status quo is extremely insufficient to bring about changes in the socio-economic situation of the region, the demographic trends and the investment climate. It could be considered that it will lead to an unplanned closure of the energy and coal industry in its present form, which does not meet the objectives of a just transition to a clean energy economy. Such a development of the situation is not recommended.

The second scenario based on the internal opportunities and advantages of the region provides for economic and territorial transformation. This transformation must overcome the extraction and burning of coal, but at the same time should preserve the regional economy. This comes close to the goals of just transition.

The third scenario of “creative upgrade” with the participation of foreign investors is the most favourable for the region of Southwest Bulgaria. The scenario envisages complete economic and territorial transformation, overcoming the negative demographic trends and establishing a favourable investment climate – factors that can lead to the achievement of a just transition.

Regardless of which route will be chosen, it will be long and will require the efforts not only of those directly employed in the coal-mining and coal-burning sector, but also of the state, business, trade unions, regions and the non-governmental sector.

The aim of the study is to become the basis for an active public discussion that will catalyse solutions of high intellectual level, based on the region's advantages. They should overcome the gradual depopulation and depersonalization of the territory and should lead to the formation of prosperous and attractive areas for the development of sustainable economic activities.

The present analysis is not a panacea; it does not give all the possible solutions and does not propose all possible measures and actions to be taken, because their number cannot be exhausted within a single document. Nevertheless, it is a necessary start for the process of transition to a clean energy economy in order to create a new growth.

PART I. INTRODUCTION

1. NATURE AND OBJECTIVES OF THE DOCUMENT

The main objective of this document[1] (abridged version) is to present a concept for a social and just transition in Southwest Bulgaria, where the economic activities of coal mining and the production of electricity from the burning of coal are realized.

THE JUST TRANSITION ENSURES ENVIRONMENTAL SUSTAINABILITY AS WELL AS DECENT WORK, SOCIAL INCLUSION AND POVERTY ERADICATION

The concept has the potential to become an integral part of low-carbon policies, both at national and EU level.

In this document, the term 'just transition'[2] [3] is used in the meaning embodied in the conceptual framework for an equitable transition as set out in several key documents. For example, the parties to the Paris Agreement agreed *"... Taking into account the requirements of* ***just transition*** *of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development."* Another document created by the International Labour Organization[4] focuses specifically on the following content *"... The* ***just transition*** *ensures environmental sustainability as well as decent work, social inclusion and poverty eradication."*

In addition, the Paris Agreement also requires: *"National Climate Change Plans, which include only transitional measures with a core principle of decent work and quality jobs", as well as "... the transition to environmentally and socially sustainable economies ... to become a powerful driver for creating new jobs, social justice and eradicating poverty. 'Greening' of all enterprises and jobs by introducing more energy efficient practices, avoiding pollution and managing natural resources through innovation, increasing sustainability and generating savings to stimulate new investment and employment."* [5]

The concept of a just transition in Southwest Bulgaria has been developed based on a thorough socio-economic analysis. It can also be perceived as a general plan[6], който допринася за изпълнението на пакета от мерки[7], приет от Европейската that contributes to the implementation of the package of measures[7], as adopted by the European Commission in July 2016 to accelerate efforts to achieve low-carbon emissions across all sectors of the economy, including land use and forestry as well as a more comprehensive Strategy on low emissions mobility.

1. This document has a full version. More information at http://www.wwf.bg/news_facts/publications//
2. https://www.oecd.org/environment/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf
3. http://www.ilo.org/global/topics/green-jobs/news/WCMS_475064/lang--en/index.htm
4. Guidelines for a just transition towards environmentally sustainable economies and societies for all, Copyright © International Labour Organization 2015, First published (2015), ISBN 978-92-2-130627-6 (print) 978-92-2-130628-3 (web pdf)
5. Cit. Note.
6. The document uses the terms "Plan for just transition"and "Concept for just transition", which should be regarded as interchangeable in order to avoid repetitions
7. http://europa.eu/rapid/press-release_IP-16-2545_bg.htm

2. GEOGRAPHICAL AND SECTORAL SCOPE OF THE CONCEPT

The geographical scope of the concept for a just transition is Southwest Bulgaria and falls within the Southwest region of Level 2 (NUTS II) within the meaning of the adopted European classification of territorial units for statistics. This scope covers the regions of Pernik, Kyustendil, Blagoevgrad, Sofia-city and Sofia-region. For the purposes of the analysis and in order to overcome the regional shadow in terms of the socio-economic data, Sofia-city was excluded. The focus is on the regions of Blagoevgrad, Kyustendil, Pernik and Sofia. The sectoral scope of the analysis is the coal and coal mining industry whose territorial focus is located in Bobov Dol and Kyustendil (Bobovdol field), Pernik (Pernik field) and Simitli (Pirin field), Gotse Delchev (Kanina mine).

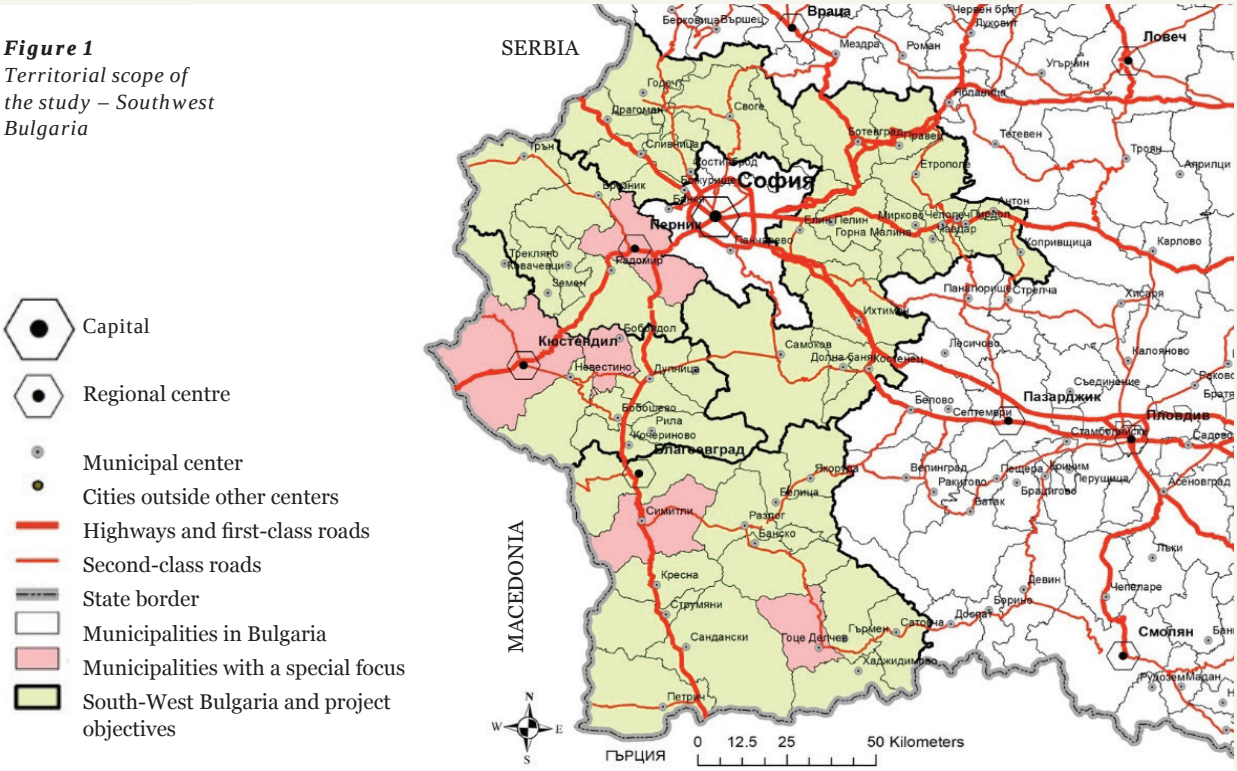


Figure 1
Territorial scope of the study – Southwest Bulgaria

PART II. CURRENT STATE (STATUS QUO) AND PROSPECTS FOR THE COAL INDUSTRY IN BULGARIA

1. ENERGY SOURCES AND ENERGY TRANSITION[8]

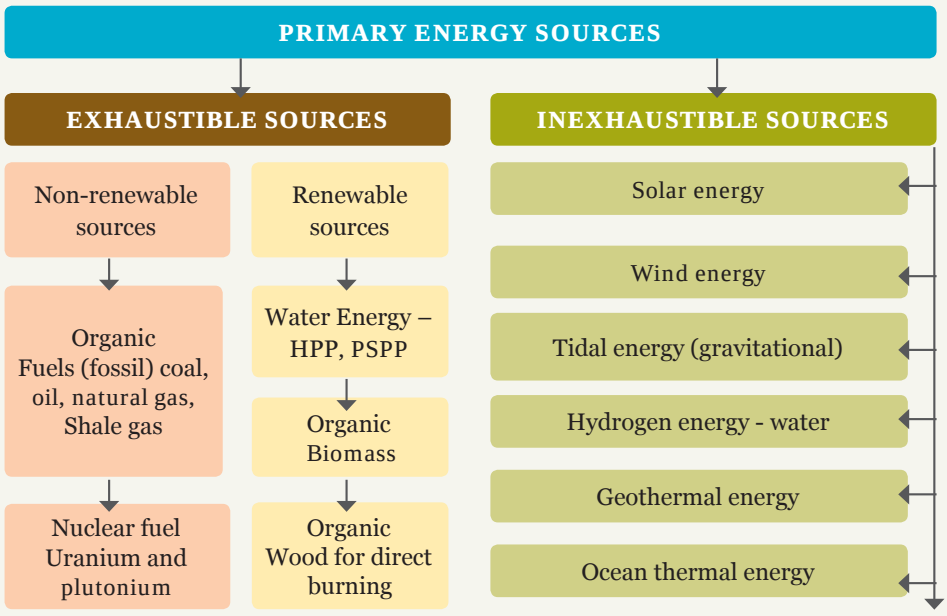
THE ONLY SIGNIFICANT **RENEWABLE SOURCES** IN THE ENERGY SYSTEM IN THE 20TH CENTURY WERE WATER, WOOD AND VEGETAL WASTE FOR COMBUSTION

The energy sector is a major economic sector on which the degree of development and efficiency of all other economic sectors depend. Still, the developed countries, incl. Bulgaria rely mainly on the extraction and use in the economic turnover of the „conventional" for the 20th century fossil energy sources – coal /lignite, brown, bituminous and anthracite/ oil, natural gas and uranium and plutonium ore. The only significant renewable sources in the energy system in the 20th century were water, wood and vegetal waste for combustion.

A special place in the increase in prices is observed for crude oil, natural gas and nuclear fuel. As a result, prices of secondary energy sources – heat and electricity, as well as fuels /liquid fuels/ – rose steeply.

A major challenge is the need to move from dependence and attachment to traditional, exhaustible and non-renewable primary energy sources to the use of renewable „green" primary energy sources.

Figure 2
General structure of primary energy sources



8. In this section are used cross-cutting for the Republic of Bulgaria texts, elaborated by the authors of this Concept and the Program for Promotion of the Use of Energy from RES and Biofuels 2014-2020 of the Municipality of Lom – http://oalom.acstre.com/assets/obshtinski_savet/strategia/programa%20vei.pdf

In order to achieve this goal, several processes of different nature must run in parallel at an affordable social price. In essence, at the municipal / local level, we can identify three main end-user units of secondary energy sources and fuels – households, companies and public institutions.

Households are the most vulnerable consumer group. The reason is that they most intensively use secondary energy sources (mainly thermal and electric power) and they need to use energy at a socially affordable price. The other two types of consumers, using energy, create added value or provide services of public significance. This fact is the most significant difference between the three types of consumers. This means that household consumers are the first to be „separated" or their consumption of secondary energy resources should be minimized from the centralized power system for supply of electricity and heat.

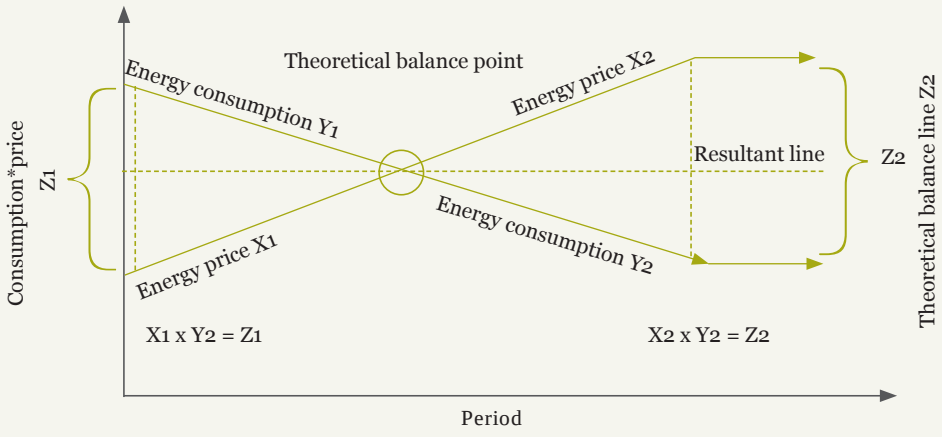
In households, secondary energy sources, i.e. heat or electricity are transformed into light, warming of living space or in the operation of power-driven electrical appliances. *This means that the primary factor for development is the answer to the question what needs are met by consumers and, most importantly, in what way*. The construction of a new power plant based on a primary energy source such as coal, oil, gas, nuclear fuel will need a minimum of 25 years to regain capital investment. This means that for these 25 years this investment **should not have any RES competition** to be able to implement its initial financial plan. Practically, this is a „deferment" of the transition to RES and low-carbon economy to a point when the capital already invested reaches the desired rates/levels of return.

THIS ANALYSIS RAISES THE QUESTION OF THE DEMAND FOR ENERGY RESOURCES AND FUELS, THROUGH TECHNOLOGIES THAT BELONG TO THE RES GROUP.

That is why the this analysis raises the question of the demand for energy resources and fuels, respectively their consumption and ways of optimization through technologies that belong to the RES group.

Setting the future parameters of generation of energy from RES should depend primarily on the level of energy intensity, the energy demand and the price per unit of energy for individual consumers – households, companies and public institutions.

Figure 3
Replacement frame of energy transition with two factors (cost and consumption) for a certain period[9]



9. Stoychev, K. (2012) Localization approaches for regional development, university Press "St. Kliment Ohridski", Sofia, ISBN 978-954-07-3398-2/Стойчев К. (2012) Локализационни подходи за регионално развитие, УИ "Св. Климент Охридски", София, ISBN 978-954-07-3398-2

CONCLUSIONS:

- The most important secondary energy sources that are needed by all three types of consumers are heat supplied by electric energy and solid fuels (coal, wood and pellets) as well as electricity.
- Regardless of the source of primary energy, electricity is the most important secondary universal energy product. It can actually meet all kinds of energy needs – heating (air and water), putting electric appliances into operation, transport (electric cars, public electric transport – railway transport, etc.).

Conclusions regarding the measures:

- The first group of measures should ensure a direct reduction in electricity and heat consumption while maintaining the utility levels;
- The second group should provide for improving the usefulness and reducing carbon intensity.

2. ANALYSIS OF COAL RESERVES IN BULGARIA

BULGARIA IS DEPENDENT ON COAL FOR ELECTRICITY PRODUCTION, WHICH REQUIRES THE PLANNING AND FINDING OF ALTERNATIVE SOURCES OF PRIMARY ENERGY

At the present stage, the following energy products are involved in drawing up the energy balance:

- **Anthracite coal** – High grade coal used both for industrial and household purposes. They have less than 10% volatile matter and a high carbon content (about 90% carbon). Their gross calorific value is more than 24,000 kJ/kg based on actual humidity and purified from impurities.
- **Bituminous coal** – High grade coal, characterized by more volatile matter (over 10%) compared to anthracite coal and lower carbon content (less than 90% carbon). Not included in anthracite coal and coking coal. Their gross calorific value is more than 24,000 kJ/kg based on actual humidity and purified from impurities.
- **Coking coal** – Coal with qualities allowing the production of fuels suitable for use in blast furnaces. Their gross calorific value is more than 24,000 kJ/kg based on actual humidity and purified from impurities.
- **Brown and lignite coal** – non-agglomerated coal with low calorific value – below 24,000 kJ/kg, containing more than 31% volatile matter and without base for dry mineral matter.

Additionally, fuels from coal, coke, tar, derived gases, natural gas, oil and petroleum distillates, petroleum products, biomass, hydropower, other fuels (non-renewable industrial waste), electricity and heat are involved in the balance.

Coal is exhaustive, non-renewable, fossil energy resource. As of 1980, industrial coal reserves in Bulgaria had the following general outline:

Table 1
Industrial reserves of coal by type in kind and conditional fuel for 1980 in%

Coal type	In kind	Conditional fuel
Lignite	92.6	84.9
Brown	6.7	13.2
Bituminous	0.5	1.4
Anthracite	0.2	0.5

Source: Y. Yovchev, 1980

As early as 1980, the total coal reserves in Bulgaria were estimated to be small. Lignite predominates in the reserves and accounted for 92.6% of the reserves in kind and 84.9% in conditional fuel. This has predetermined the coal reserves in our country to be used mainly for electricity generation. Due to their low transportability, their utilization was planned and implemented at a small distance from the mining site.

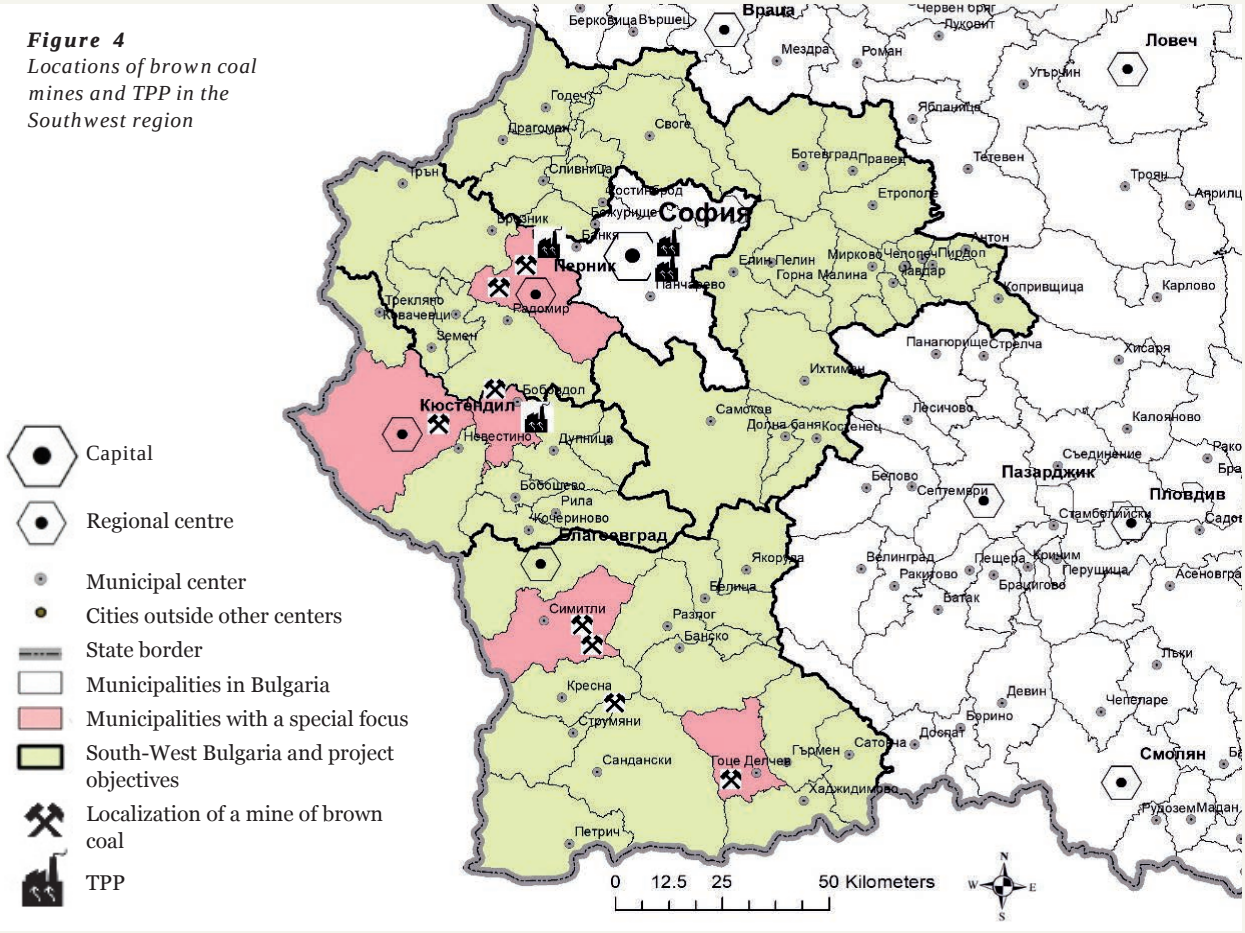
CONCLUSIONS:

- Lignite predominates with low calorific value, moisture and ash content;
- All lignite and brown coal are utilized in the economic turnover through built TPPs and occupy a significant share in the energy balance of Bulgaria;
- After the closing of some mines, many social, environmental and zoning issues occurred that do not find adequate solutions. Examples include inadequate actions on land reclamation, water catchments of surface and underground flow, etc., which result in emission of contaminants in the water, soil and air;
- All coal basins are well explored and no significant change in their volume and grade is expected;
- In the long term, the country cannot rely on the coal reserves and their use for electricity and heat generation in relation to the implementation of the smart specialization strategy of the Republic of Bulgaria 2014-2020
- The extraction and use of coal at European level is an economic activity that is subject to a significant reduction and restructuring in the long term in line with the EU 2050 energy and climate objectives .
- Anthracite coal and coke are entirely imports and are intended for domestic consumption;
- Companies that use anthracite coal and coke must take measures to introduce technological innovations (E.g. hydroxy-hydrogen cells, etc.) in order to reduce carbon emissions from their use;

10. https://www.mi.government.bg/files/useruploads/files/ris3_final_11_july_2017_bg.pdf
11. https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-energy-strategy

- Bulgaria produces brown and lignite coal, which it consumes for electricity and heat generation and the same account for over 85% of the financial costs for primary energy in the public thermal power plants;
- Our country is dependent on coal for electricity generation, which necessitates the planning and finding alternative sources of primary energy;
- The implementation of the energy and social transitions and the restructuring of the economic profiles of the affected regions is at risk due to the monostructure of the primary energy sources.
- Increasing the cost of carbon emissions in the future will continuously increase the financial burden from the use of coal.

Figure 4
Locations of brown coal mines and TPP in the Southwest region



3. OVERALL ENERGY BALANCE

The overall energy balance is prepared according to the Eurostat methodology. It presents the country's energy resources based on three sets of indicators:

- for primary energy sources
- for transformed energy
- for final energy consumption.

Table 2
Overall energy balance of primary energy sources for 2016 (thousand tons of oil equivalent)[12]

	Total	Coal	Fuels from coal	Natural gas	Oil, petroleum distillates, condensates from natural gas and additives for refineries	Petroleum products	Renewable fuels and waste (including non-renewable waste)
Primary energy generation	10,757	5,081	-	77	125	-	925
Recycled products	410	9	-	-	-	13	388
Import	12,764	495	64	2,593	6,872	2,192	155
Change in reserves	-6	32	4	18	58	-116	-2
Export	5,695	4	-	2	-	4,621	127
Marine bunkers	78	-	-	-	-	78	-
Gross domestic consumption	18,152	5,613	68	2,686	6,955	-2,610	1,339

On the territory of Southwest Bulgaria, there are two TPPs, which are involved in the production of electricity, and their capacities are as follows:

12. https://bit.ly/2Oom1GQ

Table 3
TPPs on the territory of Southwest Bulgaria

TPP	Electricity installed capacity (MW)	Annual electricity production (MWh)	Heat installed capacity (MW)	Annual heat generation (MWh)	Primary fuel	Put into operation	Owner
TPP Bobov Dol	3x210=630	Electricity from high efficiency cogeneration – 60,270 MWh. Electricity from low-efficiency cogeneration – 586,000 MWh.	3x25=75	Heat with hot water as heat carrier – 233,970 MWh.	Brown coal	1973	Consortium Energy
TPP Republika – Pernik	105	257 511	502	Heat with hot water as heat carrier – 214,700 MWh Heat with steam as heat carrier – 421,300 MWh	Coal (natural gas)	1951	District heating Pernik

Source: http://www.dker.bg/uploads/reshenia/2018/res-c17-2018.pdf
http://www.dker.bg/uploads/reshenia/2018/res-c10-2018.pdf

The final energy consumption in the country by economic sectors for the period 2012-2016 is as follows:

Table 4
Final energy consumption by sectors ((thousand toe)[13]

Sectors	2012	2013	2014	2015	2016
Industry	2576	2576	2608	2701	2634
Transport	2871	2604	2937	3255	3348
Households	2377	2257	2184	2213	2261
Agriculture	198	193	192	188	186
Services	1021	966	926	1010	1088

Source: NSI

Data on final energy consumption by sectors at regional and district level are not available, but it can be considered that the sectoral structure of energy consumption in Southwest Bulgaria is similar to the structure at national level.

13. For the calculation of the indicator NSI uses data on gross inland energy consumption, prepared on the basis of the real reported quantities of energy. Data of NSI differ with those of Eurostat, because for the calculation of the indicator Eurostat uses data on gross inland energy consumption, where the production of nuclear energy is calculated by using average coefficient for the whole European Union.

CONCLUSIONS:

- In Bulgaria, coal and fuel from coal account for 31.3% of the overall energy balance (OEB) where imported coal and fuel from coal account for 3.08%;
- Bulgaria works primarily with its own coal and imports have no leading role in the energy balance;
- RES account for about 7.4% of the total gross domestic consumption in OEB;
- The two TPPs located in Southwest Bulgaria use coal as the main fuel and account for a significant share of the total electricity generation in the country, as their installed capacity equals to 45% of that of TPP Maritsa East II (with the largest installed capacity in the country), to 58% of that of TPP – Varna (ranking second in installed capacity) and to 81% of that of TPP Maritsa East III (ranking third in installed capacity);
- Closing down TPP Bobov Dol and TPP Republika – Pernik will lead to the need for production of 903,781 MWh electricity annually from alternative sources.

Bulgaria ranks average in the EU in terms of industrial electricity price index for 2017 with values from 5.5 to 7.63 eurocents per kilowatt hour, which favours industrial locations and potential investments.

4. EUROPE CLIMATE AND ENERGY PRIORITIES. KEY PRECONDITIONS FOR TACKLING CLIMATE CHANGE IN EUROPE

a. Significant events and documents related to the Energy and Environment sectors

In the early 1960s, for the first time in world science, publications that alarmed that human growth and technology would have a serious negative impact on nature and man appeared in the fields of toxicology, ecology, etc. This was the period of post-war recovery, and most of the developed world was preparing for global economic growth, incl. Bulgaria through powerful industrialization. A number of important publications followed in this area, but the response over a fairly long period was weak and referred to certain strata of society in the individual countries. More important of those are:

- 1961 – the World Wide Fund for Nature (WWF) was established. Organization for conservation of natural resources and reduction of the negative human impact on the environment;
- 1968 – Intergovernmental conference on rational use of the biosphere under the auspices of UNESCO;

- 1970 – Earth Day was celebrated for the first time by peaceful demonstrations in the United States;
- 1971 – Greenpeace was founded in Canada for environmental protection;
- 1972 – the Club of Rome published the report "The Limits to Growth";
- 1973 – First global oil crisis caused by the establishment of OPEC;
- 1982 – the World Earth Resources Institute was founded;
- 1985 – "Climate Change" – A meeting of the World Meteorological Organization was held in Austria. There, for the first time was reported the growth of CO2 and other greenhouse gases. Global warming was prognosticated. That same year the hole in the ozone layer was established;
- 1986 – Chernobyl nuclear accident, which also affected Bulgaria;
- 1987 – The report "Our Common Future" (Brundtland), which promoted the concept of *sustainable development;*
- 1992 – United Nations Conference on Environment and Development, held in Rio de Janeiro. Agenda 21, the Convention on Biological Diversity, the Framework Convention on Climate Change and the Optional Forest Principles were adopted;
- 1992 – The European Community adopted legislation to build a common network of protected areas – Natura 2000, which to date is the largest such network in the world covering over 787 thousand km2.
- 1996 – Adoption of the voluntary international standard of corporate environmental management system ISO 14001 for the legal entities;
- 2005 – The Kyoto Protocol entered into force;
- 2005 – Reformatting of the Lisbon Strategy;
- 2006 – The Stern Review was published – it showed that the costs of inaction on climate change significantly (by 20 times) outweigh the costs of preventive action to tackle it today. According to the report, the danger of global warming to be followed by an ice age is real;
- 2006 – The film An inconvenient truth was released, where the US Vice President Al Gore posed a serious challenge to those who question the meaning of climate change debates, and the thesis that they are not provoked by human actions;
- 2009 – European climate and energy targets for 2020;
- 2015 – Europe 2030[14] indicative targets on climate and energy;
- On July 13, 2015, the European Council[15] adopted a decision based on which the EU would ratify the Doha Amendment establishing the second commitment period under the Kyoto Protocol until 31.12.2020;

14. At the date of drafting this document, these targets have not been finalized and will be added to this section after their final adoption.
15. https://www.moew.government.bg/bg/proekt-na-zakon-za-ratificirane-na-izmenenieto-ot-doha-na-protokola-ot-kioto-i-na-sporazumenieto-mejdu-evropejskiya-suyuz-i-negovite-durjavi-chlenki-i-islandiya/

- Paris climate change conference from November 30 to December 11, 2015. On December12, the countries reached a new global agreement on climate change. The agreement is a balanced result and contains an action plan to limit global warming well below 2°C. The Paris Agreement entered into force on November 4, 2016, once the conditions for ratification by at least 55 countries responsible for at least 55% of the total GHG emissions were met. All EU countries have ratified the agreement;
- 2018 – during the Bulgarian presidency of the European Council, the EU energy efficiency targets to 2030 were finalized – 32% of electricity to be generated from RES and to achieve the energy efficiency headline target of 32.5%. The new targets are set out in the revised Energy Efficiency Directive and in the revised Renewable Energy Directive adopted by the Council on December 4, 2018. The Council also adopted the so-called Governance Regulation, which determines the framework for Energy Union governance and the climate action, which ended the final stage of the legislative procedure, part of the clean energy package[16].

b. The Europe 2020 Strategy and the Energy and Environment sectors

The Europe 2020 Strategy of the EU adopted in 2010, calls for improved coordination and linkage between different policies and national strategies, including the policy and strategies for balanced and sustainable regional development within the European Union, with a view to achieving three mutually reinforcing priorities:

- smart growth: development of an economy based on knowledge and innovation;
- sustainable growth: promoting a greener and more competitive, resource-efficient economy (directly relates to the Just Transition Plan in South-West Bulgaria);
- inclusive growth: stimulating an economy with high employment rates, leading to social and territorial cohesion.

16. https://www.consilium.europa.eu/en/press/press-releases/2018/12/04/energy-efficiency-renewables-governance-of-the-energy-union-council-signs-off-on-3-major-clean-energy-files/?utm_source=dsms-auto&utm_medium=e-mail&utm_campaign=Energy+efficiency%2c+renewables%2c+governance+of+the+Energy+Union%3a+Council+signs+off+on+3+major+clean+energy+files#

5. INTERDISCIPLINARY AND CROSS-SECTORAL APPROACH TO SETTING THE TARGETS FOR ECONOMIC DEVELOPMENT AND THE ENVIRONMENT

a. Carbon- and energy intensity in the EU

Within the EU, there are serious differences between individual economies in terms of carbon intensity by country (GHG emissions /real GDP). Bulgaria is the country with the highest carbon intensity, which means that our country emits the most greenhouse gases per unit of real GDP produced.

According to the World Energy Report of British Petroleum[17] June 2017, for the period 2006-2016, Bulgaria reduces carbon dioxide emissions from 49.2 to 42.9 million tons. However, carbon intensity remains at one of the highest levels in Europe. According to data in the Bulletin on the State and Development of the Energy Sector in the Republic of Bulgaria"[18] of the Ministry of Energy (MoE), the energy intensity rate has the following general appearance:

Table 5
Energy intensity

		2012	2013	2014	2015	2016
Energy intensity of the economy – EU 28	kgoe/1000 EUR	129.8	128.1	121.3	120.1	118.6
Energy intensity of the economy – Bulgaria	kgoe/1000 EUR	467.8	426.3	445.5	448.5	422.6

The conclusion that can be drawn is that the energy intensity rate in the EU improved by 8.6% for the entire period, while in Bulgaria by 9.6%. This is insufficient to overcome the general trend and the energy intensity of Bulgaria still remains 3.56 times higher than that of the EU 28.

In this regard, as early as 2014-2015, the EC took measures by updating and setting the new targets by the end of 2030, and the negotiating process ended at the end of the Bulgarian Presidency of the EU Council.

EUROPE 2020	20 % reduction in greenhouse gases	20 % energy from RES	20 % reduction in energy consumption
EUROPE 2030	40 % reduction in greenhouse gases	≥ 32 % energy from RES	Target 32.5 % for energy efficiency

17. https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf
18. https://www.me.government.bg/files/useruploads/files/vop/buletin_2018.pdf

CONCLUSIONS:

- The increase in energy prices will continue, but the measures and policies that will be implemented will reduce energy consumption and this will provide a socially acceptable transition in terms of energy costs[19];
- An additional factor for price growth is that emerging businesses in the energy sector will aim at a higher rate of return on capital, higher incomes of the employees, and also because of the increasing social security burden in Europe and Bulgaria due to demographic challenges, etc.;
- Removing coal power from the energy systems will be another factor that will contribute to raising electricity prices to the point where renewables will be able to replace them completely in terms of power and security of supply;
- The main benefit to society (target) will be the strive to reduce greenhouse gases (decarbonisation of the economy), to curb global warming and climate change, as well as emergence of entirely new businesses and business niches that will bring about a new type of sustainable economic growth and new professions with new jobs;
- The newly emerging jobs in sectors that have not hitherto existed contain the main mechanism for socially just transition. However, they require a modern organizational structure for the transfer / diffusion of innovations, which is a serious challenge for the Bulgarian economy.

MITIGATE THE CONSEQUENCES NEEDED FOR LIMITING GLOBAL WARMING TO 1.5° C

b. A Clean Planet for All Strategy[20]

The European Commission calls for Europe to achieve climate neutrality by proposing 8 scenarios in November 2018 in its strategic long-term vision for a prosperous, modern, competitive and climate neutral economy by 2050 – A Clean Planet for all.

The Commission's vision for a climate-neutral future covers almost all EU policy areas and is consistent with the Paris Agreement's objectives in order to keep the temperature rise well below 2° C and continues its efforts to keep to 1.5° C. The strategy should be discussed and finalized by the end of 2019.

c. The European Union Roadmap to a Competitive Low Carbon Economy by 2050[21]

The European Commission is looking for cost-effective ways to make the European economy more environmentally friendly and less energy intensive. The Roadmap to a Low Carbon Economy[22], which is the forerunner of the Clean Planet for All Strategy, shows that:

19. See Figure 4 Replacement frame of energy transition with two factors (cost and consumption) for a certain period
20. http://europa.eu/rapid/press-release_IP-18-6543_bg.htm
21. https://ec.europa.eu/clima/policies/strategies/2050_bg#tab-0-1
22. https://ec.europa.eu/clima/news/public-consultation-strategy-long-term-eu-greenhouse-gas-emissions-reduction_en

- By 2050, the EU must reduce its greenhouse gas emissions to 80% below 1990 levels.
- Deadlines for achieving the targets

The Roadmap sets cost-effective way to achieve the target of 80% by 2050.

To achieve this, Europe's emissions should be:

- 40% below 1990 levels by 2030 (this target was already approved as part of the 2030 framework);
- up to 60% by 2040.

d. EU Energy Roadmap for the Period up to 2050[23]

The EU is committed by 2050 to reduce its GHG emissions to 80-95 % below 1990 levels in the context of necessary reductions by developed countries. In the Energy Roadmap for the period up to 2050, the Commission examines the challenges to the achievement of the EU's decarbonisation objective, while ensuring security of energy supply and competitiveness.

Scenarios arising from the EU Energy Roadmap by 2050:

- Current trend scenarios
- Reference scenario – current trends and long-term projections on economic development (gross domestic product (GDP) growth 1.7% per year).
- Current Policy Initiatives (CPI) – the measures adopted are being updated;

- Decarbonisation scenarios
- High Energy Efficiency
- Diversified supply technologies
- High share of renewable energy sources
- Delayed Carbon Dioxide Capture and Storage
- Low share of nuclear energy

- The Road from 2020 to 2050 – challenges and opportunities
- Transforming the energy system
- Reconsidering the energy markets
- Mobilizing Investors – A united and effective approach to incentives in the energy sector
- Involving the general public

23. https://eur-lex.europa.eu/legal-content/BG/ALL/?uri=CELEX:52011DC0885

CONCLUSIONS:

- The Interdisciplinary and cross-sectoral approach to setting the targets for economic development and the protection of the environment is related to new technologies for the development of the energy sector (including RES) as well as to the development of the circular economy and the more efficient use of resources.
- In recent decades, a significant regulatory framework has been put in place to support their implementation at both European and national levels, which already has an impact on public relations.

6. PROSPECTS FOR THE ENERGY SECTOR IN EU AND BULGARIA

a. Investments in Energy Infrastructure

Despite efforts, energy costs will grow globally by 2030 and are expected to reach 14.3% of the GDP of EU 28, which is an increase of 1.5%. Thereafter, the growth rate is expected to slow down or become close to zero. The reason for this is that a full cycle of RES technologies (hype cycle) after Gartner is expected to be completed and they will have entered in their plateau of productivity. Meaning that at this point, technologies will have reached market maturity and will have constant and predictable values, which will allow for the realization of sustainable businesses that will create new jobs.

Figure 5
Energy costs, broken down by main components (annual average as % of GDP)

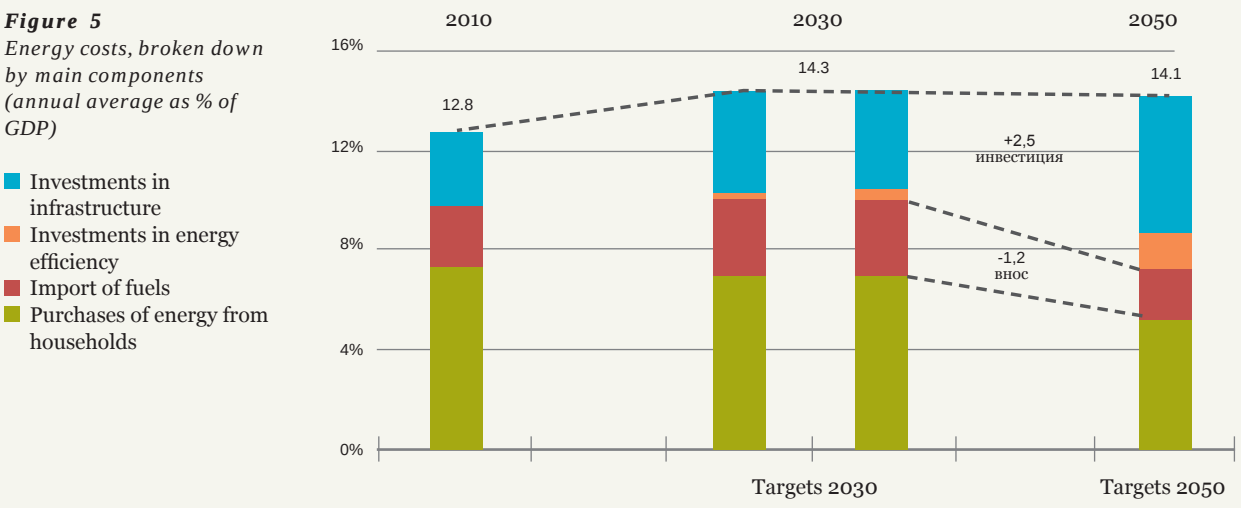
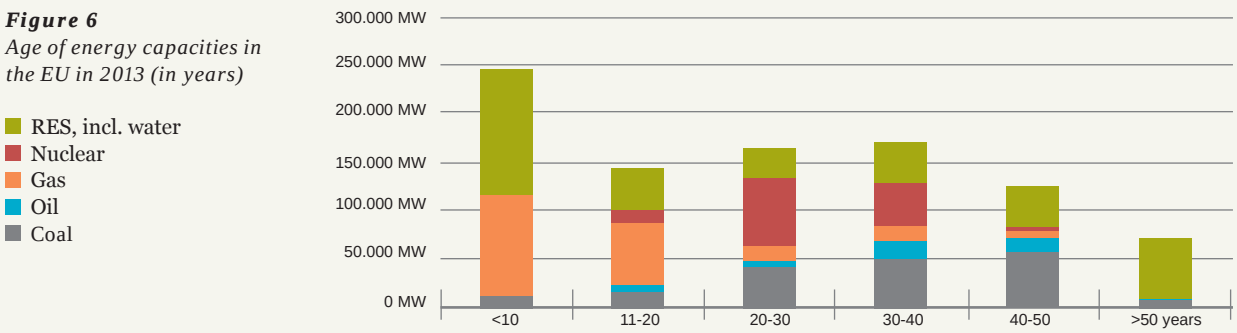


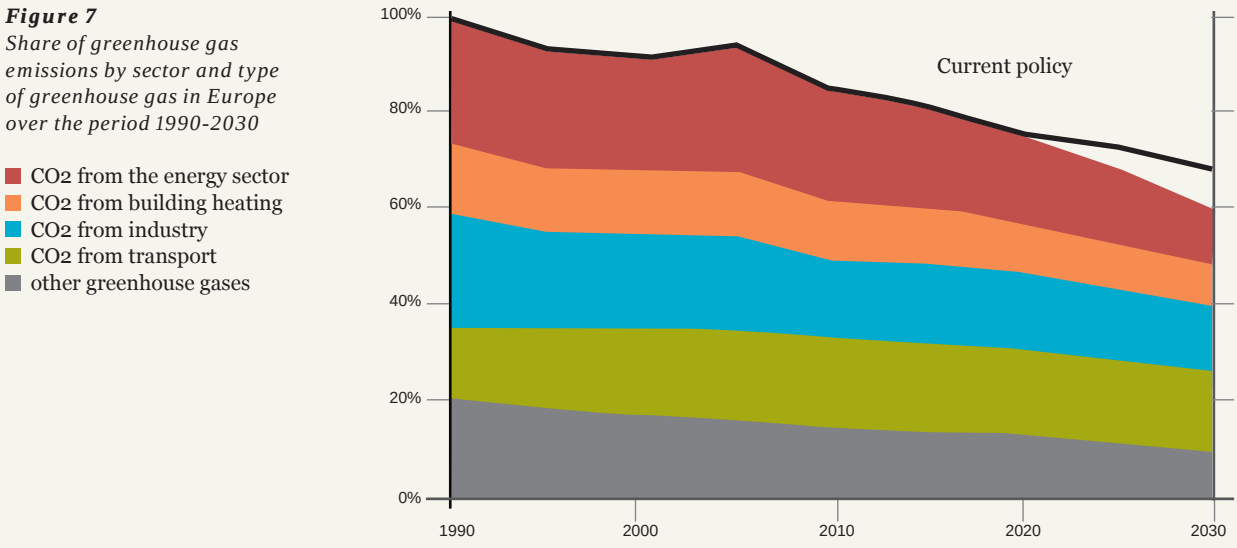
Figure 6
Age of energy capacities in the EU in 2013 (in years)

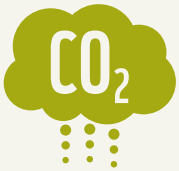


CONCLUSIONS:

- Coal-fired power plants were built mainly over a period of 30-50 years ago. Thereafter, the construction of new coal-fired energy capacities is sharply decreasing;
- The main nuclear generating capacities were built over a period of 20-40 years ago. In Bulgaria, NPP Kozloduy was put into operation in 1974;
- In the last 20 years, developed mainly gas operating capacities and RES. A particular point is that RES developed throughout the whole period, as in the earlier periods it was represented by the construction of hydro power plants – HPP;
- In the last 10-15 years there was a clear growth towards gas and RES. In the medium term, these are the two main priority sources of energy, and respectively, energy capacities. This is the main reason for the interest at European level in the construction of transcontinental gas pipelines, as well as exploration of shale gas and RES.

Figure 7
Share of greenhouse gas emissions by sector and type of greenhouse gas in Europe over the period 1990-2030



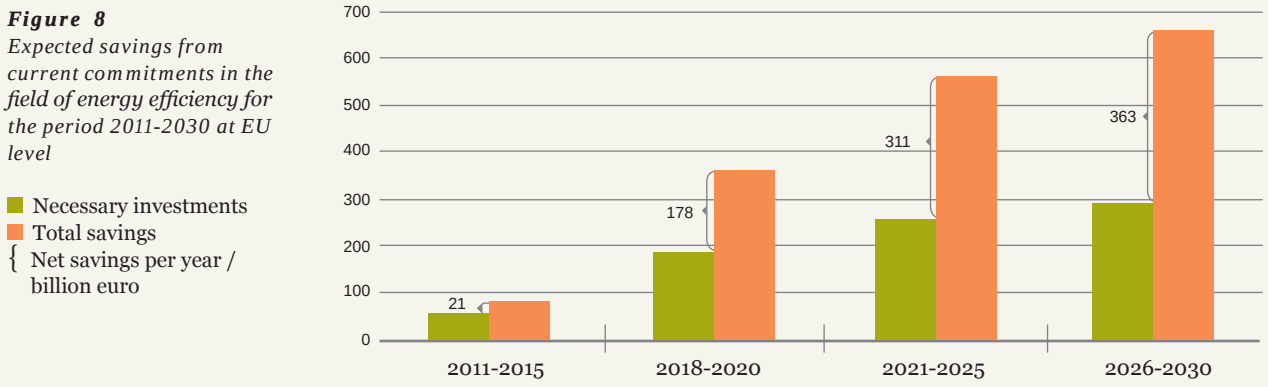


CO_2 LEVELS IN THE ATMOSPHERE SHOULD NOT EXCEED **0.045%** IN A FREE STATE

CONCLUSION:

Carbon dioxide remains the main problematic greenhouse gas. According to the Stern Review report, levels of carbon dioxide should not exceed 450 parts per million 0.045% in a free state in the atmosphere. As at 2006, levels were estimated at around 0.039%, and today they are already 0.0405%[24]. For comparison, in the 1990s, the proportion of carbon dioxide in the atmosphere was estimated at 0.021%, that is 210 parts per million. According to data from the US National Oceanic and Atmospheric Administration[25] as of 2016, the level was 402.9 parts per million (0.0403%), which according to them is the highest level in 800,000 years.

Figure 8
Expected savings from current commitments in the field of energy efficiency for the period 2011-2030 at EU level



The period 2016-2020, which falls also within the scope of this plan for just transition, is also the first one, in which the EC relies on a significant increase in savings resulting from investment in energy efficiency and the use of RES.

CONCLUSION:

A future integrated energy market at EU level will bring many benefits to all countries as it will allow more efficient management of energy costs to third countries. To date, the EU internal market for gas and electricity is estimated at values between EUR 43 and 70 billion per year. The main energy sources that the EU will rely on are renewable with a leading role of the solar, water and wind energy. The other two main sources are natural gas reserves within the EU and assessment of shale gas reserves within the EU.

24. https://www.ipcc.ch/site/assets/uploads/2018/12/State-of-the-Global-Climate-in-2018_for-COP24-DSG-1-1.pdf
25. https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide

b. Energy Commitments of Bulgaria and RES

By the EU Accession Treaty Bulgaria has undertaken an individual commitment which implied that by 2010, 11% of the gross domestic electricity consumption will be generated from RES compared to the base year of 2005. At present, according to DIRECTIVE 2009/28/EO[26] the national target is the share of energy from renewable sources in the gross final consumption of energy to reach 16% in 2020. According to data of NSI and the Chairman of the Energy and Water Regulatory Commission, on the indicator „Share RES in the final electricity consumption" Bulgaria had reached 18.2% already as of 31.12.2017.[27]

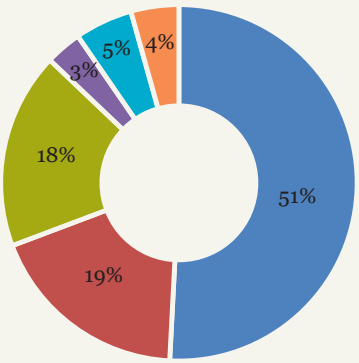
According to data in the Bulletin on the State and Development of the Energy Sector in the Republic of Bulgaria of the Ministry of Energy (ibid.), the rate has the following general appearance, indicating that by 2016 a share of 18.8% of electricity from RES has been achieved.

Table 6
Energy production and consumption structure in Bulgaria (thousands of tons of oil equivalent – toe)[28]

		2012	2013	2014	2015	2016
Primary energy production	1000 *toe*	11,318	10,218	10,910	11,509	10,757
Energy consumption	1000 *toe*	18,305	16,954	17,752	18,536	18,152
Final energy consumption	1000 *toe*	9,044	8,597	8,847	9,367	9,517
Electricity produced from renewable sources – share in gross electricity consumption	%	16.1	19.0	18.0	18.2	18.8

According to official NSI data[29], the share of RES in the gross domestic/inland energy consumption as of 31.12.2016, reached 7.37% and 8.6% of primary energy production.

Primary energy production, % of the total value as of 31.12.2016 (667 ktoe)



- Landfill waste – renewable; 29;
- Hydropower (without PSPP); 339;
- Wind energy; 123;
- Solar (photovoltaic) energy; 119;
- Solar thermal energy; 22;
- Geothermal energy; 35;

Source: NSI, www.nsi.bg

26. http://www.seea.government.bg/documents/DIREKTIVA_2009_28.pdf
27. https://bit.ly/2NPrglG
28. https://www.me.government.bg/files/useruploads/files/vop/buletin_2018.pdf
29. https://bit.ly/2xgHdb4

RENEWABLE ENERGY SOURCES IN THE COUNTRY

51
HYDROPOWER

21%
SOLAR ENERGY

19%
WIND ENERGY

5%
GEOTHERMAL ENERGY

4%
LANDFILL WASTE

CONCLUSIONS:

- Hydropower is the main source of RES in Bulgaria – 339 ktoe or 51 % of all RES (excluding wood, vegetal waste and bio-diesel);
- There is a key role of hydropower and biomass in the production of renewable energy;
- Geothermal energy generates 35 ktoe or 5%;
- The two newest and fastest growing sources are solar power (photovoltaic 119 ktoe 18% and thermal 22 ktoe 3%), accounting for a total of 21% of RES and wind power for the production of electricity totalling 19% or 105 ktoe of all RES in the country.
- There are no reliable statistics on energy balances at regional and district level.

PART III. GEOGRAPHICAL SCOPE AND REGION INFORMATION

1. GENERAL PHYSIOGRAPHIC CHARACTERISTICS OF THE SOUTHWEST REGION (NUTS II) – DISTRICTS OF PERNIK, KYUSTENDIL, BLAGOEVGRAD, SOFIA-DISTRICT

The territory of the Southwest Level 2 region is located in a variety of natural landscape areas and occupies 18.3% of the territory of the country with a very varied relief – from a highly expressed alpine relief to valley and low-lying areas in the river watersheds.

The complexity of the geological structure is reflected in the variety of mineral resource deposits. Some of them are of limited stocks and low quality. The main source of fuel energy resources are the available coal deposits – brown coal (Pernik – Pernik District, Bobov Dol – Kyustendil District, Pirin – Blagoevgrad District); lignite coal (Sofia basin – Sofia District, Kyustendil District, Blagoevgrad District) and anthracite coal (Svoge basin – Sofia District).

In the Southwest region, from north to south three climatic areas are changing – moderate-continental (mainly on the territories of Sofia District and partly of Pernik District), transcontinental (Pernik District, Kyustendil District, parts of Blagoevgrad District) and Continental-Mediterranean (southern part of Blagoevgrad District).

CONCLUSIONS:

- The main source of fuel energy resources in the region are the available coal deposits – brown coal, lignite and anthracite coal;
- The extraction and production of electricity from coal, as well as the extensive construction of HPP and mHPP have negative impact on the environment and on the land where such activities develop;
- The varied topography of the target area is favourable for the development of alternative economic activities – agriculture (oats, rye, potatoes, hops, flax, vegetables, raspberries, etc.), pasture farming, forestry, transport, tourism (incl. balneological and SPA), etc.

2. SPECIFIC INDICATORS FOR ANALYSIS OF EXTREME METEOROLOGICAL AND CLIMATIC PHENOMENA AND TRENDS IN CLIMATE CHANGE

a. Current state of the climate in SW region

According to the Köppen classification[30] the climate in the continental climatic area of Bulgaria is characterized by the basic types – Moderately warm rainy climates "C" and Boreal climates "D" (cool summer and cold winters in the middle mountain and high mountain areas), and the climate in the Continental-Mediterranean is moderately warm with dry summers.

The expected trends in climate change and the occurrence of extreme phenomena in Bulgaria and in particular in the SW region are analysed based on the results from the climate models data available on the website of the Netherlands meteorological institute – KNMI Climate Explorer[31], as well as on information published in the specialized literature on climatology.

The assessment of the trend of seasonal and annual precipitation for the period 1961-2012, shows divergent trends that are close to 0 and not statistically significant. Therefore, surveillance data does not show any changes in precipitation values for the period 1961-2012. Precipitation is unchanged, but a lasting change has been established in precipitation patterns.

b. Expected changes in air temperature and precipitation in the 21st century

The results of the regional climate models for Central and Eastern Europe, including Bulgaria, analysed under the CECILIA project[32] show a statistically significant positive trend of the average air temperature of 1.5°C for the period 2012-2050 compared to the reference period 1961- 1990.

The precipitation patterns in the 20th and the beginning of the 21st century, as well as the future changes are characterized by an overall downward trend in South Europe, including Bulgaria[33]. In recent years, there has been an increase in the frequency of extreme rainfall.

CONCLUSION:

Climate change trends (including more frequent natural disasters – droughts, floods, hailstorms as well as extreme climatic phenomena) over the last decades on a global scale are also valid for the region of Southwest Bulgaria, resulting in a number of negative consequences for the economy (in particular for agriculture), the quality of life of the population and the infrastructure.

30. https://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.html
31. https://climexp.knmi.nl, достъп 28 юни, 2018
32. The main objective of the CECILIA project is to assess the impact on climate change and the vulnerability of the regions in Central and Eastern Europe – http://www.cecilia-eu.org/
33. IPCC 2007 , EEA, 2012 г., PRUDENCE, 2005 г.

3. ANALYSIS OF THE OF THE AMBIENT AIR QUALITY

a. Ambient air quality

The World Health Organization considers six substances as major air pollutants (WHO 1999[36]). These are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO2), soluble particles including dust, vapours, smoke, sulphur dioxide (SO2) and tropospheric ozone (O3). According to the Law on the Purity of Atmospheric Air (amended and supplemented, No. 12 of 03.02.2017), the quality of the ambient air is determined by the levels of suspended particles; fine particulate matter; sulphur dioxide; nitrogen dioxide and / or nitrogen oxides; carbon monoxide; ozone; lead (aerosol); benzene; poly cyclic aromatic hydrocarbons; heavy metals – cadmium, nickel and mercury; arsenic.

b. Links between climate change and air pollution

Changes in the composition of the Earth‘s atmosphere caused by pollution lead to changes in the redistribution of solar radiation in the atmosphere and between the atmosphere and the Earth‘s surface.

Changes in atmospheric circulation may alter the distribution of pollutants in the air. The precipitation intensity influences the concentration of pollutants in the atmosphere and their deposition on the Earth‘s surface[37].

c. Ambient air quality in the surveyed area

The districts of Kyustendil, Pernik, Blagoevgrad and Sofia are included in the Southwest AAQMA (Ambient Air Quality Management Area).

ДАННИТЕ ОТ МОНИТОРИНГА НА ВЪЗДУХА ПОКАЗВАТ, ЧЕ ОСНОВНИ ЗАМЪРСИТЕЛИ В ЮЗР СА СЕРНИЯТ ДИОКСИД И ПРАХЪТ

CONCLUSIONS:

- Air monitoring data in the surveyed area indicates that sulphur dioxide and dust are the main pollutants;
- The high concentrations of dust up to 10 μm (PM10) in the Pernik region are due to the industrial activity in the city, and one of the main sources of harmful substances is the TPP „Republika“. Important sources of dust are the two dams of DHC Pernik AD, especially in adverse weather conditions (strong south wind);. Dust sources include also road transport and the availability of area sources;
- A major source of particulate emissions in Kyustendil District is the TPP „Bobov Dol” ash pond[38]. Mass sources of registered excessive pollution are the burning of solid fuels in households, transport operations and the dirty and poorly maintained road and street pavements;

36. WHO (1999). Guidelines for Air Quality. Geneva, World Health Organization
37. Seip and Menz, 2002
38. Regional Strategy for Development of Kyustendil District 2014-2020

- For the territory of Blagoevgrad the largest contribution to particulate matter pollution has the local heating of homes with solid fuels, which is the reason for higher concentrations during the winter months. Particulate matter pollution is also due to construction activities as well as to the poor condition of the infrastructure. Meteorological conditions may further increase the negative effect in the winter. During the winter period of 2017 – 2018, were registered 51 values exceeding the daily average values, which represents 28% of the total number of samples. Compared to the winter period of 2016 -2017, during the reporting period there was a decrease in the number of days with values exceeding the daily average values by 30%[39]. During the summer period, when emissions are mainly from transport, the PM10 concentration is almost constant.
- Even after industrial activity has been restricted, emissions of harmful substances (especially sulphur oxide, nitrogen oxides and carbon dioxide) in the atmosphere from industrial combustion and production processes are stable, confirming that domestic heating and inefficient energy installations are the main source of pollution in the area[40].

4. WATER QUALITY

The larger part of the analysed territory belongs to the West Aegean Basin Directorate where water pollution has been found to be mainly from industrial wastewater and wastewater of urban sewage networks.

CONCLUSIONS:

- By and large, the surface water quality in the target area is assessed as excellent – very good;
- In recent years, an improvement of the groundwater quality and reduction of the number of points with exceedances of the quality standards has been established, but there are still groundwater bodies and sites at risk in the Southwest region.

5. Analysis of the Natural Hazards and Risks

Natural hazards and risks include geomorphological, hydrological and climatic risks.

39. Report on the State of Ambient Air Quality in Blagoevgrad, MOEW
40. Pernik District. Development Strategy 2014-2020

CONCLUSIONS:

- The review of natural hazards and risks on the territory of Southwest Bulgaria shows that the most likely natural hazards and risks are landslides, floods, forest fires and, to a certain extent, seismic risk;
- The more frequent droughts and decreasing snow cover have a direct impact on the way and diversity of growing different crops, as well as on the development of winter sports and tourism;
- These risks, as well as the possible locations for their occurrence in the target area, should be taken into account when deciding on investments in alternative economic activities proposed under the different scenarios described below.

58
PROTECTED AREAS IN BLAGOEVGRAD DISTRICT

6. CHARACTERIZATION OF THE PROTECTED AREAS IN THE SOUTHWEST REGION

According to the Protected Areas Act, a number of protected areas of a different category have been declared in the administrative districts of the southwest region. There are 58 protected areas in Blagoevgrad District, including: 2 national parks – *Pirin*, which is entirely on the territory of southwest Bulgaria and *Rila* – partially; 1 natural park – *Belasitsa*; 10 reserves; 2 maintained reserves, many protected areas and natural landmarks.

7. POPULATION AND DEMOGRAPHY

a. General demographic characteristics and trends in the country and the region

Between the last two censuses in the country (as of 01.03.2001 and 01.02.2011) the population at national level decreased by 7.1% (564,331 p.). The observed negative trend continues, and according to the latest annual data on the ongoing demographic processes as of 31.12.2017, the population of Bulgaria is 7,050,034. That is, for the monitored period 2001-2017, the population of the country decreased by 11.1%, equal to 878,867 people. Demographic decline is even more significant, but is partly offset by the Bulgarian administration's activity in issuing passports and naturalizing Bulgarian citizens.

The population dynamics at SWR level is characterized by a reverse trend compared to that of the country, which is explained by the contribution of Sofia (capital) to the values for the region.

Table 7
Population dynamics at national and regional level in the period 2001-2017

	Total population at:			Growth /%/	Growth /%/
	01.03.2001	01.02.2011	31.12.2017	2001-2011	2001-2017
Bulgaria	7,928,901	7,364,570	7,050,034	- 7.1%	-11.1%
Southwest region	2,097,621	2,132,848	2,108,394	1.7%	0.5%

Source: NSI – http://www.nsi.bg

b. General demographic characteristics and trends in Sofia District

In the period between 2001 and 2017, the population of Sofia District[39] marked a gradual decrease, and between the last two censuses in the country carried out in 2001 and 2011, the inhabitants of the district decreased by 25,751 people, equal to 9.4%. Manifestation of the adverse trend characterizing demographic developments is still ongoing, with a decrease by 15,926 million in the period 01.02.2011 – 31.12.2017, representing a decrease by 6.4%. This is particularly worrying trend, as this is the district that is the natural periphery of the capital, but nevertheless shows the same trend as the more remote districts.

Population projection for Sofia District

A population projection of three versions for Sofia District by 2040 is calculated for the purposes of the analysis:

- *Pessimistic version:* ***153 166 д.***
- *Adjusted optimistic version:* ***317 942 д.***
- *Realistic version:* ***211 119 д.***

CONCLUSIONS:

- The dynamics indicates that in the period 2001-2017, the population on the territory of the municipalities Dragoman and Godech declines at a more unfavourable rate than the average for the district, the region and the country. It is alarming that only in the period 2011-2017, is reported a decline of the population by 10.1% (540) for the municipality of Dragoman and by 9.9% (534) for the municipality of Godech. The small population of the localities at issue is the cause of the reported high negative relative value (%), representing a decline in population;
- Proximity and employment in a coal mine is a strong centrifugal (stimulating) factor for emigration.

39. http://www.regionalprofiles.bg/bg/

c. General demographic characteristics and trends in Pernik District

In the period 2001-2017, the population of the district gradually decreased, and between the last two censuses in Bulgaria (2001 and 2011) the population at district level declined by 16,302, or 10.9%. In the period between the last census (01.02.2011) and the date of the latest annual data on the demographic processes in the country (31.12.2017), the population of Pernik District declined by 11,109, equal to 8.3%.

In the administrative area of the district coal mining is carried out on the territory of the Municipality of Pernik. The reported data on the dynamics of the population at the municipal level reveal the observed disturbing trends accompanying the demographic development of the municipality of Pernik. It is noteworthy that only in the period 2011-2017, the residents of the municipality decreased by 8.0%, equivalent to 7,749 people. The reported negative relative value is significantly higher than the national average (-4.3%). The observed unfavourable trend at the municipal level is also valid for the territory of the municipal centre – the town of Pernik, whose population in the period 2011-2017 decreased by 6,553 people, or by 8.2%.

Population projection for Pernik District

A population projection of three versions for Pernik District by 2040 is calculated for the purposes of the analysis:

- *Pessimistic version:* ***74 332 д.***
- *Adjusted optimistic version:* ***166 602 д.***
- *Realistic version:* ***110 626 д.***

d. General demographic characteristics and trends in Kyustendil District

In the period 2001-2017, the population of the district gradually decreased, and between the last two censuses in Bulgaria (2001 and 2011) the reported decline was 15.9% (25,848 p.). It is extremely worrying that as a result of the continuing unfavourable demographic processes in the district, only in the period 2011-2017 the residents of Kyustendil District decreased by 11.5% (15,677 p.).

Population projection for Kyustendil District

A population projection of three versions for Kyustendil District by 2040 is calculated for the purposes of the analysis:

- *Pessimistic version:* ***58 094 д.***
- *Adjusted optimistic version:* ***158 306 д.***
- *Realistic version:* ***103 764 д.***

CONCLUSION:

- If the present age and educational structure is maintained, future investors will have to rely mainly on people with primary and secondary education, which will be a serious challenge for them.

e. General demographic characteristics and trends in Blagoevgrad District

In the period 2001-2017, the population of the district gradually decreased, and between the last two censuses in Bulgaria (2001 and 2011) the residents of Blagoevgrad District declined by 5.2% (17,621 p.). The unfavourable trends in the demographic development at district level continue and in the period 01.02.2011 – 31.12.2017 was registered a decrease of the population by 4.8% (15,670 p.).

Population projection for Blagoevgrad District

A population projection of three versions for Blagoevgrad District by 2040 is calculated for the purposes of the analysis:

- *Pessimistic version:* ***240 216 д.***
- *Adjusted optimistic version:* ***437 063 д.***
- *Realistic version:* ***292 045 д.***

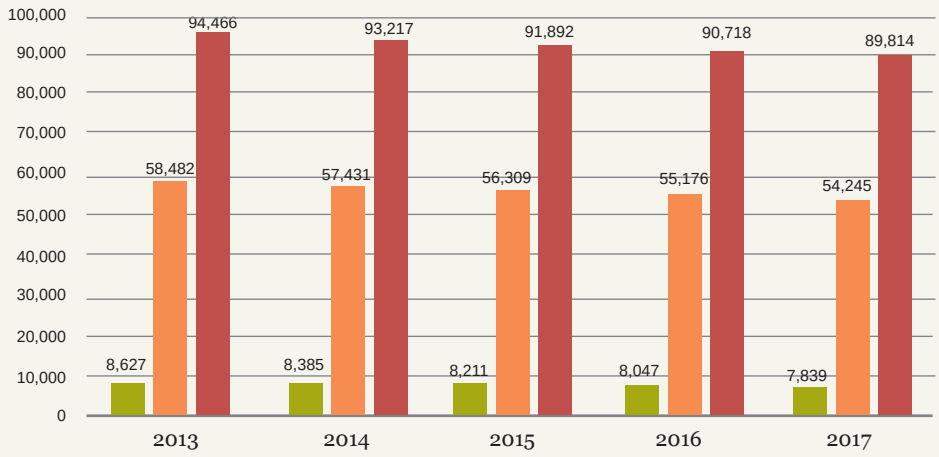
CONCLUSIONS:

- The reported data characterizing the ongoing demographic processes in the target districts of the SWR – Sofia, Pernik, Kyustendil and Blagoevgrad, follow the path of the negative trends observed at national level;
- For two of the districts (Pernik and Kyustendil), alarming figures presenting the dynamics of the population in the period 2001-2017 are reported. The aging of the population is characterized by a faster rate than the average for the country and the educational structure is deteriorating as well;
- Blagoevgrad District marks the most favourable values of the considered demographic indicators and has the lowest negative value representing the decrease of the population in the period 2001-2017 compared to the other three districts included in the analysis;
- Sofia District holds an intermediate position vis-à-vis the other three analysed districts. The district takes little advantage of the opportunities provided by the proximity to the capital and at this stage performs the functions of a periphery with gradually deteriorating indicators.

f. Demographic characteristics and trends in the SWR in the context of the concept

This is an analysis presented at administrative district level, and where data is available at the municipal level, they focus on the municipalities of Bobov Dol, Kyustendil and Pernik, where people are employed in the coal industry. These municipalities will suffer the greatest negative effect, if current demographic trends and projections continue. However, they can benefit most if the forecasts of the concept of transition to a clean energy economy materialize.

Figure 9
Population of the municipalities of Bobov Dol, Kyustendil and Pernik for the period 2013-2017



Source: NSI – http://www.nsi.bg

CONCLUSIONS:

- The population of the municipality of Bobov Dol is 8.7% of the population of municipality of Pernik and 14.5% of the population of municipality of Kyustendil, although Bobov Dol is the main location for coal mining and coal-based energy production. Therefore the largest share of the active population in the municipality is employed namely in this sector, which is confirmed by the employment data in the Municipal Development Plan of Bobov Dol for 2014-2020;
- The restructuring of the energy sector in the future and the transition to a clean energy economy in the region are expected to have the greatest impact on the workforce and migration processes for workers and their families from the municipality of Bobov Dol, where the problem of dismissal of a significant number of people employed by the coal industry is already in place;
- Measures to create alternative employment have already been delayed and negative social effects have occurred since the labour-releasing process has begun.

Figure 10
Population by municipalities in SWR as of 31.12.2016

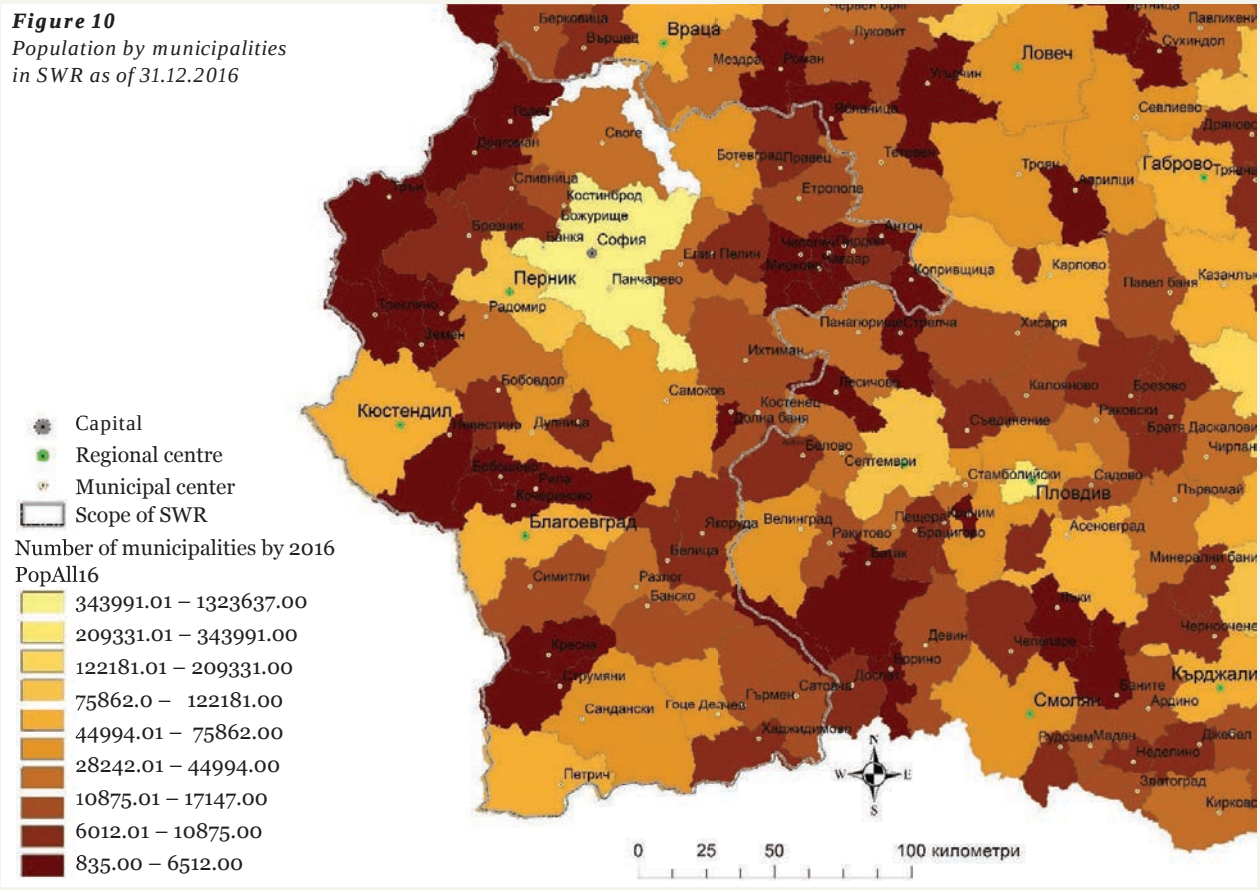
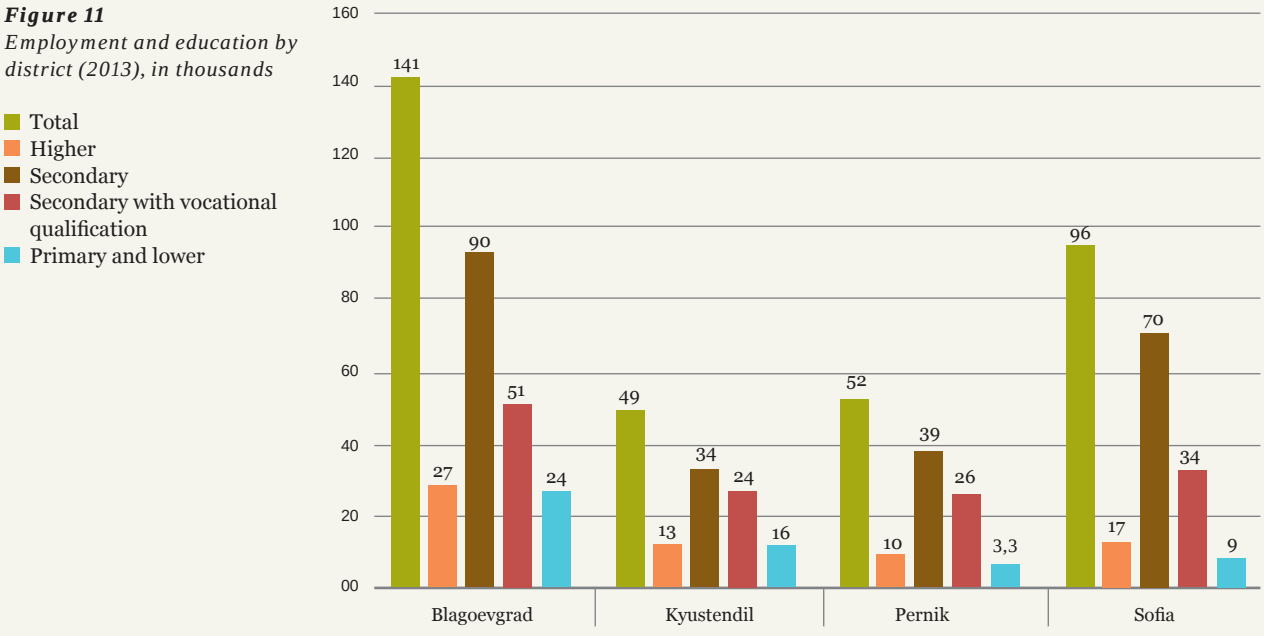
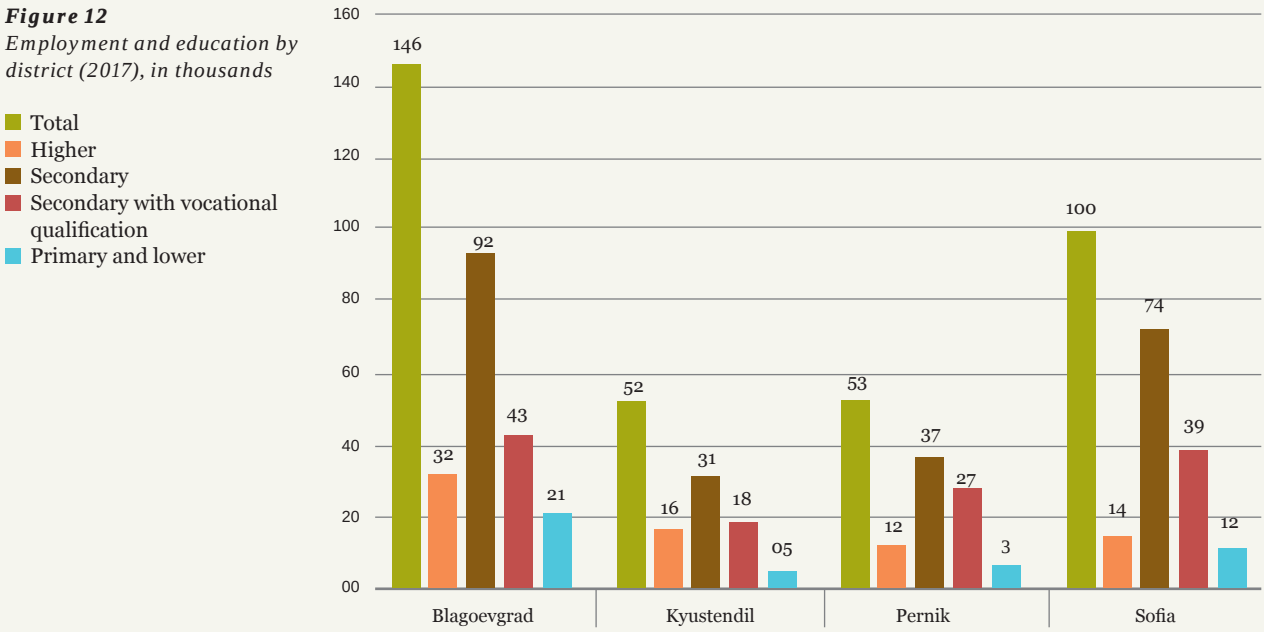


Figure 11
Employment and education by district (2013), in thousands



Source: NSI – http://www.nsi.bg

Figure 12
Employment and education by district (2017), in thousands



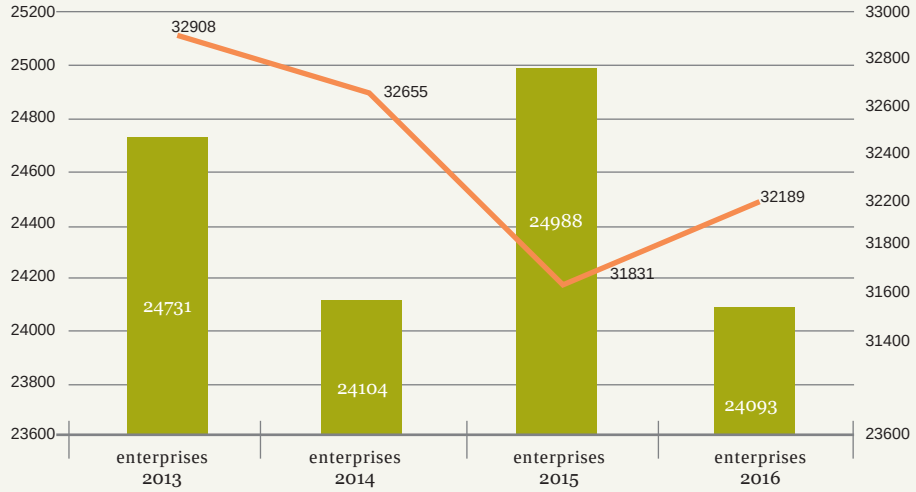
Source: NSI – http://www.nsi.bg

CONCLUSIONS:

- In the four districts, the highest is the number of employees with secondary or secondary vocational education, and for the Blagoevgrad, Kyustendil and Pernik districts in 2017, there is an increase in the number of employed persons with higher education compared to 2013;
- If the same or similar structure of the education level among those employed in the target territory is maintained, future investors or emerging micro- and small businesses will have to rely more on a workforce that can provide for low- to medium-tech industries, or industries that are more automated;
- In the absence of effective measures to increase the qualification level of the labour force, the Southwest region will not be able to rely on specialization in high tech industries and the introduction of innovations. This will limit its development potential and the negative demographic trends would remain or even increase their rate.

Figure 13
Number of active enterprises in the Mining and Energy Production and Distribution of energy and gas sectors in Bulgaria (2013-2016)

Figure 14
Number of persons employed in the Mining and Energy Production and Distribution of energy and gas sectors in Bulgaria (2013-2016)



Source: NSI – http://www.nsi.bg

CONCLUSIONS:

- There is a steady trend to decrease in the number of active enterprises in the mining and in the production and distribution of energy and gas sectors, which is due both to internal restructuring and to the consolidation of this type of businesses;
- There is a continuing trend of fluctuations in the number of persons employed in both sectors, probably due to internal sectoral restructurings, e.g. increase in the number of persons employed in the non-ferrous metal industry and decrease in the number of employees in the coal mining industry;
- This type of workforce is highly specialized and change their residence according to market needs, and this spatial behaviour is expected to continue in the future.

Figure 15
Number of enterprises in the Mining and Energy Production and Distribution of energy and gas sectors in the Southwest region (2013-2016)

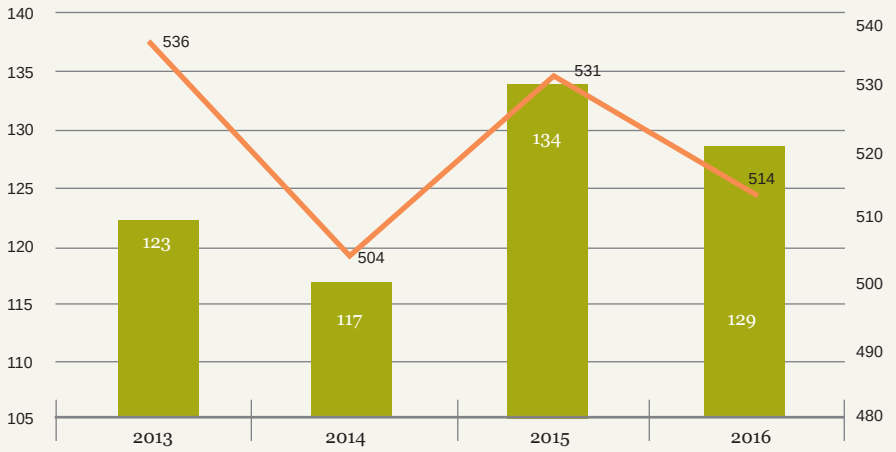
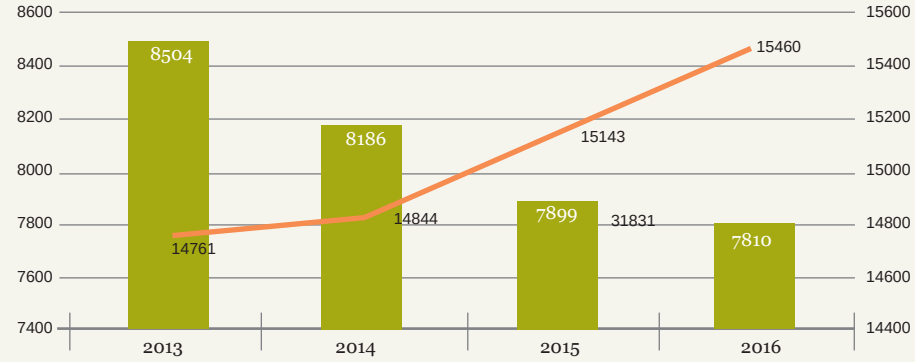


Figure 16
Number of persons employed in the Mining and Energy Production and Distribution of energy and gas sectors in the Southwest region (2013-2016)



Source: NSI – http://www.nsi.bg

CONCLUSIONS:

- In the period 2013-2016, the number of enterprises in SWR in the Mining and Production and distribution of energy and gas sectors remain relatively constant. This trend is opposite to the national one;
- The number of persons employed in the mining industry decreases, but the number of employees in the sector of production and distribution of energy and gas is increasing. It could be said that there is a transfer of workforce from one sector to the other. This trend will be strengthened with the implementation of more RES projects;
- The number of employees dismissed from the mining sector in the last 4 years ranges from 100 to 500 people per year. It is assumed that this annual rate will be maintained and that future investments creating new jobs in other sectors will have to take this capacity into account.

8. ECONOMIC DEVELOPMENT OF SWR

a. Dynamic Shift-Share Analysis (DSSA)

The analysis of the economic situation is carried out by assessing employment by economic activities (NACE sectors – 2008)[42] for the districts of Blagoevgrad, Kyustendil, Pernik and Sofia[43]. The method used is Dynamic Shift-Share Analysis (DSSA)[44], tracking the rate of change in employment at national, regional (SWR) and district level. Estimates for these four districts have been developed, analysing different scenarios for their economic development (optimistic, realistic and pessimistic) as regards the rate of change of employees and the size of production quantities in the non-financial sector in the period up to 2035.

The method allows to 'isolate' the competitive position of each smaller territory from the influence of the national trend and the so-called industrial mix in the dynamics by the number of the employed that exists for the analysed period.

Growth is decomposed into three parts (factors): national growth, industrial structure (mix) and regional competition.

The „National growth" (N) component measures the increase in the number of employees that would occur if all sectors of the economy grew at the national rate of change in the number of employees.

The impact of the Industrial structure (I or Si) captures the impact of the industrial structure of the national economy on regional employment or on GDP growth. A country with a concentration of fast-growing industries will have a positive impact on the industrial structure. Contrariwise, a country with a concentration of slow-growing industries will have a negative impact on the industrial structure of the region.

The Regional competition impact (RCI or Ri) measures the difference between regional and national industrial growth rates. It indicates whether the relevant sector or subsector is regionally adaptive. If, after calculating the national growth rate and the industrial mix of the region, the values are positive, it is assumed that the region/ municipality has some comparative advantages that provide for economic performance that exceeds the national growth rate in the relevant subsector and / or in general.

This forecast is based on an approach using data on the number of **persons employed** under an employment or service relationship in the period 2011-2016. The localization coefficient (LQ) based on employee data defines the location of the sectors in a two-dimensional space. The aim is to identify those sectors, which have comparative advantages and are basic for the regional economy of SWR and are the growth-holders, but allocated in relation to the national impulse, sectoral share and regional adaptability.

40. Classification of economic activities (NACE) of 2008 (single letter code = sector A, B, C, D, etc.) – http://www.nsi.bg/sites/default/files/files/publications/KID-2008.pdf
41. Stoichev K., (2008) Regional Balance of Industrial Production: Structure and Optimization, Sofia, 2008/ Стойчев К., (2008) Регионален баланс на промишленото производство: структура и оптимизация, София, 2008 г. – http://www.suggfrpg.net/files/AvtoreferatFINAL.pdf
42. Dynamic Shift-Share analysis

b. Main conclusions regarding the economic development of the Southwest region based on DSSA (NACE sectors – 2008) for the period 2011-2016.

Table та по-долу представя в обобщен вид резултатите от извършения анализ на икономическото състояние на областите София, Перник, Кюстендил и Благоевград по отношение темпа на промяна на заетостта в отделните сектори по КИД-2008.

Table 8
Summary DSSA parameters for SWR by districts

District	Наети лица			NACE sectors-2008 with growth in the share of employees for 2011-2016	NACE sectors -2008 with decline in the share of employees for 2011-2016
	2011. (number)	2016 (number)	rate (%)		
Sofia	57,184	60,808	6.3%	• **Growth in sectors:** A, C, H, J, N, O, P, R, S • The highest growth is reported in sectors: H – Transport and storage (37.2%) and C – Manufacturing (24.6%)	• **Decline in sectors:** B, D, E, F, G, I, L, M, Q • **The largest decline is reported in sectors:** Q – Human health and social work activities (-16.0%) and L – Real estate activities (-15.9%)
Pernik*	28,396	27,148	- 4.4%	• **Growth in sectors:** A, E, H, J, K, M, Q, S • **The highest growth is reported in sectors:** E – Water supply; sewerage; waste management and remediation activities (28.1%) and H – Transport and storage (20.6%)	• **Decline in sectors:** C, F, G, I, L, N, O, P, R • **The largest decline is reported in sectors:** F – Construction (-13.7%), N – Administrative and support service activities (-13.6%) and R – Arts, entertainment and recreation (-13.2%)
Kyustendil*	32,269	30,241	- 6.3%	• **Growth in sectors:** A, H, N. • **The highest growth is reported in sector:** A – Agriculture, forestry and fishing (65.4%)	• **Decline in sectors:** C, E, F, G, I, J, K, L, M, O, P, Q, R, S. • **The largest decline is reported in sectors:** L – Real estate activities (-41.5%), J – Information and communicaiton (-37.6%) and K – Financial and insurance activities (-30.6%)
Blagoevgrad	88,086	89,355	1.4%	• **Growth in sectors:** B, D, H, I, J, M, P, Q, R • **The highest growth is reported in sectors:** B – Mining and quarrying (nearly 540%), H – Transport and storage (81.8%), M – Professional, scientific and technical activities (32.6%)	• **Decline in sectors:** A, C, E, F, G, K, L, N, O, S • **The largest decline is reported in sectors:** L – Real estate activities (-27.8%) and K – Financial and insurance activities (-24.2%).

* The data for sectors B – "Mining and quarrying" and D – "Production and distribution of electricity and heat and gaseous fuels" fall into the category "Confidential".

CONCLUSIONS:

- Based on the current policies of the country, only the sector „Transport and storage“ is in the first group of three of the districts, i.e. the sector realized a growth of employees at district and regional level;
- Sofia District demonstrates an increase in the Manufacturing sector, due to the proximity of the capital;
- Pernik District increases the number of employees in the sector “Water supply; sewerage; waste management and remediation activities”, but loses employees in three key sectors, including „Construction“;
- Kyustendil District is in the most complicated position than the other districts in SWR and achieved growth only in the sector „Agriculture, forestry and fishing”. The most difficult from a social and economic point of view in this administrative area will be the launching of a new type of economic growth, as the most negative demographic processes have been established here;
- Blagoevgrad District has the most favourable results compared to the other districts in SWR. The sector “Professional, scientific and technical activities” is of key importance for growth due to the universities, which provide personnel and immigration of young people to the district.

9. COMPETITIVE AND COMPARATIVE ADVANTAGES OF THE REGION

Demographic and economic conditions describe the situation of SWR, but it is necessary to perform a qualitative analysis to reveal the comparative and competitive advantages. Some of the accepted methods are Porter‘s Diamond and SWOT analysis.

Porter‘s Diamond (Porter‘s Framework) is a qualitative method that aims to determine the competitive advantages of certain industries in a particular territory. It is a good basis for a qualitative assessment of the industrial strategies, company policies, foreign markets, product advantages, production factors, etc., but it is not founded on in-depth corporate and government planning and logic in SWR and in Bulgaria. This creates chaos in the construction of infrastructures, the development of specific industries, the mining of energy raw materials and energy production, agriculture and other sectors whose specialization and interconnection are relatively weak and sometimes contradictory.

In this regard, the present concept of more sustainable economic activities must be based on the following basic principles:

- Incubation of business environment that generates new ideas, realizes the underlying investments with its own funding and external (borrowed) capital, support from EU funds or a combination thereof;
- Incubation of business environment that knows and develops to the optimal extent the sources of the regional competitive advantage;

- Improving the investment process in the areas that will be most affected by the implementation of the concept;
- Implementing government policy, which complements the investment process by lending financial resources outside the designated European funds and programs, without dominating it;
- Encouraging public and private projects that could be implemented and sustained on a market basis as an alternative to the public resource, incl. grants (G);
- Finding companies for partnerships that could lead to technology transfer, investment in key infrastructure and workforce training in innovative techniques and skills.

For the purposes of the concept, the following combined SWOT matrix was developed according to the methodology:

Figure 17
Combined SWOT analysis

Internal environment	External environment: Opportunities	External environment: Threats
Weaknesses	• We seek to strengthen the connections between agglomeration areas of the National Spatial Development Concept 2013-2025 for accelerated socio-economic and infrastructure development; • We seek to increase competitiveness by investing in R & D that is technologically tied to the local economy and resource efficiency; • We look for energy sources for the industry and households, replacing the extraction and burning of coal.	• We prevent the intensification of negative demographic trends by investing in the local economy, decentralization measures and equitable utilization of EU funds; • We prevent practices and regulatory decisions leading to continued use of coal mining and coal combustion; • We prevent active and passive resistance to highly needed regulatory and structural reforms.
Strengths	• We use the favourable geographic location, the proximity of Sofia and Thessaloniki for the development of alternative tourism, alternative agriculture and the development of cultural and historical heritage; • We use existing engineering infrastructure to locate new companies and simplify procedures for building new infrastructure; • We use the available energy transmission infrastructure to the benefit of RES to increase their share at the cost of coal mining and coal burning.	• We oppose newly created jobs and urban centres against external competition and external migration; • We oppose workforce training and retraining as the main tool for improving income and labour efficiency against low incomes and employment; • We oppose high-tech RES and new jobs against the energy sector based on coal mining and coal burning.

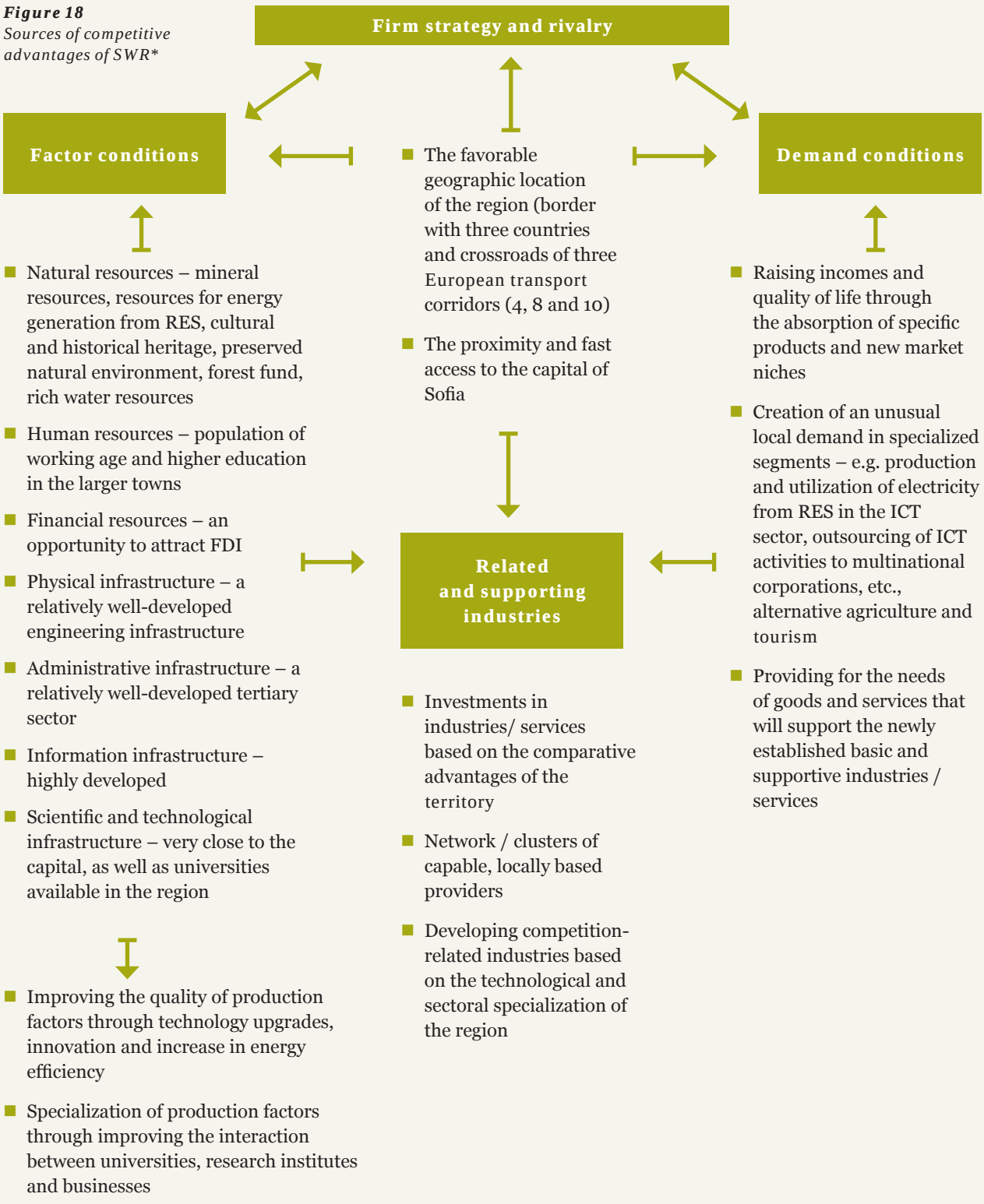
Based on the combined SWOT analysis, the following comparative and competitive advantages of the target area can be identified:

Comparative advantages:

- *With exhaustive potential for the development of the energy sector in the short and medium term* – a variety of mineral resources, incl. coal deposits, metal ores, inert materials, etc., which allow the production of electricity and raw materials at a lower price than in other territories of the country that do not have these resources (exception is the area of the Maritza East industrial complex located in the eastern part of the Upper Thracian Plain, about 40 km southeast of the city of Stara Zagora);
- *With potential for further development of the energy sector* – resources for the production of energy from RES – wind, solar, hydro and geothermal;
- *With potential for developing alternative economic activities* – preserved cultural and historical heritage and natural environment with a rich biodiversity and a high share of protected areas and NATURA 2000 sites; high share of the forest fund and the availability of significant forestry resources as well as rich water resources, including hydrothermal for use in agriculture and balneology;
- *Necessary to maintain and develop the local economy* – favourable geographic location and developed engineering infrastructure (roads, water supply, telephony, fibre optic cables, power supply) and tertiary sector.

Competitive advantages of the region based on Porter's Diamond:

Figure 18
*Sources of competitive advantages of SWR**



* The categories of competitive advantages of SWR are derived from the developed and adopted strategic documents at regional and district level

PART IV.
POSSIBLE SCENARIOS FOR ALTERNATIVE ECONOMIC ACTIVITIES

The transition from coal-based to low- or zero-emission economy is now an inevitable reality due to the recent amendments in the European legislation on the environment, climate and energy, and wider penetration and use of renewable energy sources and energy conserving technologies.

It is no longer a question of if, but of when we will abandon coal?

However, the key issues remain: Will this transition be smooth and socially just for regions in the European Union that for decades have been relying on coal, fuelling their economic growth with carbon intensive energy at the expense of the health of their communities and the environment? Are the changes going to be painful, with disastrous consequences for the social cohesion of mining regions[43]

The Southwest region of Bulgaria is in immediate need for urgent answers to these questions because the changes are already happening painfully and if appropriate action is not taken, these changes will have truly catastrophic consequences for the demographic and economic situation of the area. The data from the demographic and economic analysis indicate that the district of Kyustendil is the most vulnerable, and the coal industry is situated exactly there (Bobov Dol). This means further complication of the socio-economic situation.

In order to mitigate the negative effects of these changes that are already happening, as well as to prevent the worst case scenario – *to maintain the status quo or to do nothing*, the present concept offers two additional alternative scenarios:

1) A growth scenario based on the internal opportunities and advantages of the region;

2) "Creative upgrade" scenario with the participation of foreign investors based on the concept of "creative destruction"[46].

Below is a summary of each of the three scenarios which includes a description of the proposed economic activities as well as conclusions and recommendations regarding their potential implementation and effects for the SWR.

The proposed economic activities for each scenario are assigned to priority areas, which are formulated based on the combined SWOT analysis as follows:

43. In Europe and other parts of the world there are already good practices that show that just transition is possible.
44. Creative destruction is a term invented by Joseph Schumpeter in „Capitalism, Socialism and Democracy" in 1942, and describes „the process of industrial mutation that continually revolutionizes the economic structure from within, continuously destroys the old, continuously creates new infrastructure." This happens when innovation deconstructs long-standing arrangements and releases resources to be deployed elsewhere.

Combination of the SWOT analysis	Combined elements	Priority area
„Oportunities – Weaknesses“ combination	Seeking increase competitiveness by investing in R & D that is technologically tied to the local economy and resource efficiency;	INNOVATION AND COMPETITIVENESS
„Oportunities – Strengths“ combination	Using the available energy transmission infrastructure to the benefit of RES to increase their share at the cost of coal mining and coal burning.	DECARBONISATION AND ENVIRONMENTAL PROTECTION
„Threats – Strengths“ combination	Opposing workforce training and retraining as the main tool for improving income and labor efficiency against low incomes and employment;	FURTHER TRAINING AND INCREASING THE INCOME OF THE WORKFORCE

1. SCENARIO 1 – MAINTAINING THE STATUS QUO

This scenario presumes maintaining the current situation, meaning that the main economic activities in the target territory will retain their structure, which is heavily reliant on energy based on coal-mining and coal-burning. Maintaining the status quo also involves implementation of the measures and activities planned in the strategic documents at the regional, district and municipal levels. Currently the demographic situation continues to deteriorate, severely undermining the labour market and the cost-effectiveness of labour, which involves a major risk to population income growth and related investment.

At this stage of Bulgaria’s development, business is structured around family-type micro and small enterprises, which are extremely vulnerable to external factors and which use low- to medium-skilled labour. The workers to be dismissed from the coal-mining industry in the future in the case of a tardy and prolonged restructuring of the region have deeply rooted work habits and salary expectations, which could rather be considered as a risk for prospective investors. Such investors would need to invest substantial financial resources and time in retraining the workforce and transforming its work attitudes.

The economic growth to be expected in this scenario would amount to 1% – 2% per annum, or at best equal the national-level growth, which is far from adequate to change the socioeconomic state of the region, the demographic trends and the investment climate. Such marginal growth can be viewed as a slow downturn and does not correspond to the philosophy and objectives of a just transition to an economy which is based on clean energy while taking account of social factors and the welfare of residents and the region.

The scenario of maintaining the status quo presumes a gradual shrinkage in the workforce[45] and the internal market potential, as well as an increase in the share of people over the working age and of the old-age dependency ratio.

In view of these considerations, this scenario will mainly rely on the implementation of the measures and activities planned in the already existing and/or future strategic documents, programmed through the 'top-down' approach and disregarding the actual needs of the region. Those measures and activities which are relevant to this concept are summarised with reference to the priority areas laid out above, as follows:

Priority area	Measures			
	Primary sector	Secondary sector	Tertiary sector	Quaternary sector
INNOVATION AND COMPETITIVENESS	• Development of the energy sector as is • Development of agriculture and forestry	• Provision of technical and engineering infrastructure • Improvement of the tourism infrastructure • Development of the processing industry	• Development and diversification of the tourism product– spa, winter sports, rural and ecotourism	• Promoting entrepreneurship, R&D and innovation within existing programmes
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE		• Development of the social, educational and health infrastructure and services	• Human resources development through education, qualification, cultural life • Social inclusion of minority and marginalised groups	
DECARBONISATION AND ENVIRONMENTAL PROTECTION	•Improving energy and resource efficiency (reducing the use of primary energy sources)	• Waste management (Benchmarks II and III[46])	• Waste management (Benchmark I) • Integrated water management • Conserving and maintaining biodiversity • Protection and development of cultural and historical heritage	

45. BSee Table 15, Population dynamics at national and regional level in the perod 2001-2017, and Figure 50, Population numbers by municipality in the SW region as at 2032 (forecast)
46. Benchmark I in waste management means the collection and haulage of waste, Benchmark II means waste recycling, Benchmark III means waste reuse

The table below outlines the link between the priority areas and the region's **comparative advantages:**

Priority area	Comparative advantages
INNOVATION AND COMPETITIVENESS	**With depleting potential for development of the energy sector in the short and medium term:** • Development of the energy sector as is **With a potential for further development of the energy sector:** • Promoting entrepreneurship, R&D and innovation within existing programmes **With a potential for development of alternative economic activities:** • Development of agriculture and forestry; development of the processing industry; development and diversification of the tourism product– spa, winter sports, rural and ecotourism **Necessary to maintain and develop the local economy:** • Provision of technical and engineering infrastructure; improvement of the tourism infrastructure
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**With a potential for further development of the energy sector:** • Human resources development through education, qualification, cultural life **With a potential for development of alternative economic activities:** • Human resources development through education, qualification, cultural life **Necessary to maintain and develop the local economy:** • Development of the social, educational and health infrastructure and services; human resources development through education, qualification, cultural life; social inclusion of minority and marginalised groups
DECARBONISATION AND ENVIRONMENTAL PROTECTION	**Necessary to maintain and develop the local economy:** • Waste management (Benchmarks II and III); integrated water management; protection and development of cultural and historical heritage; conserving and maintaining biodiversity **With a potential for development of alternative economic activities:** • Waste management (Benchmark I); integrated water management; protection and development of cultural and historical heritage; conserving and maintaining biodiversity **With a potential for further development of the energy sector:** • Improving energy and resource efficiency (reducing the use of primary energy sources)

The table below outlines the link between the priority areas and the region's **competitive advantages:**

Priority area	Competitive advantages of the region based on Porter's Diamond
INNOVATION AND COMPETITIVENESS	**'Firm strategy and rivalry' group** • The proximity and fast access to the capital city **'Factor conditions' group** • Scientific and technological infrastructure **Related and supporting industries' group** • Investment in industries/services based on comparative advantages **'Demand conditions' group** None
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**'Firm strategy and rivalry' group** • The proximity and fast access to the capital city **'Factor conditions' group** • Human resources **'Related and supporting industries' group** None **'Demand conditions' group** None
DECARBONISATION AND ENVIRONMENTAL PROTECTION	**'Firm strategy and rivalry' group** • The favourable geographic location of the region **'Factor conditions' group** • Physical infrastructure **'Related and supporting industries' group** • Investment in industries/services based on comparative advantages **'Demand conditions' group** None

Due to the absence of any other in-depth study, Scenario 1 is based on the sum total of the indicative financial resources planned for the implementation of the District Development Strategies (DDS) of the Blagoevgrad, Kyustendil, Pernik and Sofia districts for the period 2014-2020, which are shown below:

District	Indicative financial resources for the implementation of the 2014-2020 DDS
Blagoevgrad	BGN 980 million
Kyustendil	BGN 350 million
Pernik	BGN 97.5 million
Sofia	BGN 617 million
Total	**BGN 2,044.5 million**

The indicative financial resources are distributed by source as follows:

Table 9
Distribution of the indicative financial resources by source – Scenario 1

Priority area	Measures	Financial resources (BGN)			
		EU programmes and other donor programmes	National public funding	Private investment, incl. loans	Total (BGN)
Innovation and competitiveness	Provision of technical and engineering infrastructure	595,000,0000	105,000,0000	30,000,0000	730,000,000
	Development of the energy sector as is				
	Promoting entrepreneurship, R&D and innovation				
	Development of agriculture and forestry				
	Improvement of the tourism infrastructure				
	Development and diversification of the tourism product– spa, winter sports, rural and ecotourism				
	Development of the processing industry				
	Promoting entrepreneurship, R&D and innovation within existing programmes				
Improving the qualifications and income of the workforce	Human resources development through education, qualification, cultural life	306,000,000	54,000,000	18,500,000	378,500,000
	Development of the social, educational and health infrastructure and services				
	Social inclusion of minority and marginalised groups				
Decarbonisation and environmental protection	Waste management	765,000,000	135, 000,000	36,500,000	936,500,000
	Integrated water management				
	Conserving and maintaining biodiversity				
	Protection and development of cultural and historical heritage				
	Improving energy and resource efficiency (reducing the use of primary energy sources)				
	Total:	**1,666,000,000**	**294,000,000**	**85,000,000**	**2,045,000,000**

Expected socioeconomic effect of Scenario 1

Based on the multiplier effect determined for the separate districts and the SWR, it is estimated[46] (that employee numbers in sector B, the Mining (including coal-mining) sector, and sector D, Production and distribution of electrical and thermal energy and gaseous fuels, are as follows:

- Blagoevgrad – 435 people
- Kyustendil – 3,055 people
- Pernik – 1,434 people
- Sofia District – 3,355 people
- Total SWR – 8,279 people

This means that future measures will mostly affect the districts of Kyustendil, Pernik and Sofia. Given the economic growth parameters thus estimated, this scenario can be assumed to correspond to the pessimistic version of the multiplier effect, calculated as follows:

Table 10
Employees in the mining industry and multiplier – Scenario 1

District	Employees in sectors B and D (number)	Conservative estimation of employees in sectors B and D (%)*	Employees in the mining industry (% of the total population)	Pessimistic multiplier scenario (population numbers)	Realistic multiplier scenario (population numbers)	Structural change in employment in the mining industry (employee numbers)
Algorithm for calculation	(1)	(2) = (1)*%	(3) = = (1)/(5)%	(4)	(5)	(6) = = (4)*(2)*(3)
Blagoevgrad	435	0%	0.15%	240,216	292,045	0
Kyustendil	3,055	50%	2.94%	58,094	103,764	854
Pernik	1,434	50%	1.29%	74,332	110,626	479
Sofia	3,355	20%	1.59%	153,166	211,119	487
Total	**8,279**	**-**	**1.15%**	**525,808**	**717,554**	**1,820**

*The estimation of the percentage of coal-mining employees is based on the sector analysis

In summary, the following structural change in employment is expected in sectors B and D in the case of Scenario 1:

- Blagoevgrad – no structural change expected
- Kyustendil – 2,201 jobs will be retained, and 854 jobs will be lost
- Pernik – 955 jobs will be retained, and 479 jobs will be lost

46. See Item 7 of Section III

- Sofia District – 2,868 jobs will be retained, and 487 jobs will be lost
- Total SWR – 6,024 jobs will be retained, and 1,820 jobs will be lost

Scenario 1 requires solving the social issue of finding new jobs for 1,820 people.

CONCLUSIONS ON SCENARIO 1

- Scenario 1 presumes a continued decline in population numbers, deterioration of the age and gender structure, increased strain on the social insurance system and increasing numbers of people over the working age;
- Due to an inadequate availability of socioeconomic alternatives, the sustainable economic growth required to keep the population in the region and surmount emigration sentiments will not be achieved. This means that a significant share of those over 1,800 newly redundant workers and their families will emigrate to other parts of Bulgaria or abroad;
- Even if business retains its current structure, it will rely on increasingly limited workforce resources and a business environment dominated by companies which do not have environmentally friendly policies and alternatives in place;
- The additional social strain will also prevent the achievement of the EU 2030 climate targets and will thus bring about financial sanctions;
- The districts of Kyustendil, Pernik and Sofia will deepen their position as the most depressive areas in socioeconomic terms and will fail to achieve a sustainable transition to a low-carbon economy.

RECOMMENDATIONS

- The only recommendation concerning Scenario 1 is to make the required political and socioeconomic efforts to avoid the scenario of 'maintaining the status quo' or 'doing nothing'.

2. SCENARIO 2 – GROWTH BASED ON THE REGION'S INTERNAL CAPABILITIES AND ADVANTAGES (ENDOGENOUS GROWTH)

This scenario is based on the region's internal development capabilities, taking into account the combined SWOT analysis for the Southwest region of Bulgaria, being as follows:

- Improving competitiveness through investments in R&D which are technologically bound to the local economy and to resource efficiency;
- Using the existing energy transmission infrastructure to serve RES and increase their share in the place of coal-mining and coal-burning;
- Focusing on the qualification and retraining of the workforce as a primary tool to improve income and labour efficiency and deal with low income in employment.

In addition, this scenario also takes account of the need to meet the EU's decarbonisation targets and environmental requirements and to focus on the 'green' development of the region based on its resources and potential.

This scenario presupposes a shift away from the current situation to bring about an economic and territorial transformation based on the region's internal advantages and resources. Such transformation should surmount the economy reliant on coal-mining and coal-burning. Scenario 2 is also based on the fact that the demographic situation currently continues to deteriorate, severely undermining the labour market and the cost-effectiveness of labour, which involves a major risk to population income growth and the related investment. The scenario does not expect significant internal and external immigration processes but has the capacity to overcome emigration from the region.

Scenario 2, too, is based on the fact that at this stage of Bulgaria's development, business is structured around family-type micro and small enterprises, which are extremely vulnerable to external factors and which use low- to medium-skilled labour. The workers to be dismissed from the coal-mining industry in the future in the case of an accelerated restructuring of the region will indeed be economically and psychosocially motivated to obtain retraining, shift their work attitude and transfer to lasting employment in other economic sectors.

The economic growth to be expected in this scenario would amount to 2% – 3.5% per annum, potentially even reaching the national-level growth, and thus change the region's socioeconomic state, demographic trends and investment climate. This moderate growth can be considered to preserve the regional structure and comes closer to the philosophy and objectives of a just transition to an economy which is based on clean energy while taking account of social factors and the welfare of the region and its residents.

The scenario of growth based on the region's internal capabilities and advantages is focused on preserving the employment structure while bringing about an internal restructuring to other, more efficient economic sectors while also achieving a larger share of RES in energy generation and consumption.

In view of these considerations, this scenario will mainly rely on the assumption of increased internal entrepreneurship on the part of the local population and business. It does not preclude implementation of the measures and activities from Scenario 1 included in the projects under the District Development Strategies and the Municipal Development Plans funded through various donor programmes.

Scenario 2 includes the following measures and activities, including indicative priority area businesses:

Priority area	Measures			
	Primary sector	**Secondary sector**	**Tertiary sector**	**Quaternary sector**
INNOVATION AND COMPETITIVENESS	• Gradual closure of the coal-mining sector in the region • Gradual transition to RES energy generation • Development of agriculture and forestry ***Indicative businesses:*** *Alternative agriculture: herbs – lavender, ginseng, goji berry, saffron, etc.*	• Development of the processing industry. Preferential lending to SMEs in the secondary sector. ***Indicative businesses:*** *Manufacture of RES components: water heating panels, photovoltaic panels, micro wind turbines, hydropower (surface and underwater currents);* *Manufacture of appliances and devices equipped with solar panels, such as light fittings, road signs, signboards, souvenirs, signposts, information boards, etc.;* *Extrusion of bioplastics using waste plastics and wood, including firewood – exterior and interior profiles with various applications in construction and design, etc.*	• Development of tourism through sustainable use of the natural environment and CHH in the region ***Indicative businesses:*** *Theme and amusement parks, including ones built on recultivated land and offering primarily cultural and environmentally friendly experiences, etc.*	• Development of scientific research and innovation in the field of RES ***Indicative businesses:*** *A cluster of RES production companies and universities in the region – joint labs, testing centres, experimental sites, etc.*
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE		• Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following industries: RES, agriculture, forestry, the processing industry, tourism	• Providing benefits to micro and small entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc. Preferential lending. ***Indicative businesses:*** *Development of business incubators and start-up business parks, etc.*	• Social innovation supporting young scientists and others holding a master's or higher degree for joint work with companies based in the region

			• Providing social benefits to young families, such as additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for pre-school- and school-age children, etc. • Engaging locals in the local administration's urban and rural development policies and activities – through regular public consultations (local referenda), public discussions of local investment projects, etc.	
DECARBONISATION AND ENVIRONMENTAL PROTECTION	• Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land	• Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption; • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials.	•Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-phase out use of the land and buildings previously used by the coal-mining and coal-burning sector.	• Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.

The table below outlines the link between the priority areas and the region's **comparative advantages:**

Priority area	Comparative advantages
INNOVATION AND COMPETITIVENESS	**With a potential for further development of the energy sector:** • Gradual closure of the coal-mining sector in the region; gradual transition to RES energy generation; **With a potential for development of alternative economic activities:** • Development of agriculture and forestry; development of the processing industry. preferential lending to SMEs in the secondary sector; • Development of scientific research and innovation in the field of RES; **Necessary to maintain and develop the local economy:** • Development of tourism through sustainable use of the natural environment and CHH in the region
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**With a potential for further development of the energy sector:** • Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the RES area **With a potential for development of alternative economic activities:** • Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following areas: agriculture, forestry, the processing industry, tourism; • Providing benefits to micro and small entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc. Preferential lending; • Providing social benefits to young families, such as additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for pre-school- and school-age children, etc.; • Social innovation supporting young scientists and others holding a master's or higher degree for joint work with companies based in the region. **Necessary to maintain and develop the local economy:** • Engaging locals in the local administration's urban and rural development policies and activities – through regular public consultations (local referenda), public discussions of local investment projects, etc.
DECARBONISATION AND ENVIRONMENTAL PROTECTION	**With a potential for further development of the energy sector:** • Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption; • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials; • Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc. **With a potential for development of alternative economic activities:** • Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land.

	Necessary to maintain and develop the local economy: • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials; • Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-closure use of the land and buildings previously used by the coal-mining and coal-burning sector; • Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.

The table below outlines the link between the priority areas and the region's **comparative advantages:**

Priority area	Competitive advantages of the region based on Porter's Diamond
INNOVATION AND COMPETITIVENESS	**'Firm strategy and rivalry' group** • The favourable geographic location of the region[47]; • The proximity and fast access to the capital city **'Factor conditions' group** • Financial resources; • Physical infrastructure; • Information infrastructure; • Natural resources; • Scientific and technological infrastructure **'Related and supporting industries' group** • A network/clusters of capable, locally based suppliers; • Investment in industries/services based on comparative advantages **'Demand conditions' group** • Improving income and the quality of life through mastering specific products and new market niches; • Generating uncustomary local demand in specialised segments, such as generation and consumption of RES power in the ICT sector, ICT outsourcing for trans-national corporations (TNCs) and others, alternative agriculture and tourism
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**'Firm strategy and rivalry' group** • The proximity and fast access to the capital city; • The favourable geographic location of the region **'Factor conditions' group** • Administrative infrastructure; • Human resources **'Related and supporting industries' group** • A network/clusters of capable, locally based suppliers **'Demand conditions' group** • Improving income and the quality of life through mastering specific products and new market niches

47. The green text indicates what is more compared to Scenario 1

DECARBONISATION AND ENVIRONMENTAL PROTECTION	**'Firm strategy and rivalry' group** • The favourable geographic location of the region **'Factor conditions' group** • Natural resources; • Financial resources; • Information infrastructure; • Physical infrastructure **'Related and supporting industries' group** • Investment in industries/services based on comparative advantages **'Demand conditions' group** • Generating uncustomary local demand in specialised segments, such as generation and consumption of RES power in the ICT sector, ICT outsourcing for trans-national corporations (TNCs) and others, alternative agriculture and tourism

Scenario 2 is deemed to require twice the financial resources required for Scenario 1, as the first scenario is primarily based on what is planned in the District Development Strategies and the Municipal Development Plans, which barely assess and touch upon business entrepreneurship, while the present scenario focuses on the establishment and development of small and medium-sized enterprises which will benefit from the region's internal resources and competitive advantages.

The indicative financial resources are distributed by priority area and by source as follows:

Table 11
Distribution of the indicative financial resources by source – Scenario 2

Priority area	Measures	Financial resources (BGN)			
		EU programmes and other donor programmes	National public funding	Private investment, incl. loans	Total (BGN)
Innovation and competitiveness	Gradual closure of the coal-mining sector in the region	900,000,000	200,000,000	1,400,000,000	2,500,000,000
	Gradual transition to RES energy generation				
	Development of agriculture and forestry				
	Development of the processing industry. Preferential lending to SMEs in the secondary sector.				
	Development of tourism through sustainable use of the natural environment and CHH in the region				
	Development of scientific research and innovation in the field of RES				

Improving the qualifications and income of the workforce	Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following areas: RES, agriculture, forestry, the processing industry, tourism	300,000,000	50,000,000	150,000,000	500,000,000
	Providing benefits to entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc.				
	Providing social benefits to young families, such as additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for pre-school- and school-age children, etc.				
	Social innovation supporting young scientists and others holding a master's or higher degree for joint work with companies based in the region				
	Engaging locals in the local administration's urban and rural development policies and activities – through regular public consultations (local referenda), public discussions of local investment projects, etc.				
	Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land				
	Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption				

Decarbonisation and environmental protection	Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials	500 000 000	50 000 000	450 000 000	1 000 000 000
	Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.				
	Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-closure use of the land and buildings previously used by the coal-mining and coal-burning sector				
	Total:	**1,700,000,000**	**300,000,000**	**2,000,000,000**	**4,000,000,000**

Expected socioeconomic effect of Scenario 2

Based on the multiplier effect determined for the separate districts and the SWR, it is estimated[49] that employee numbers in sector B, the Mining (including coal-mining) sector, and sector D, Production and distribution of electrical and thermal energy and gaseous fuels, are as follows:

- Blagoevgrad – 435 people
- Kyustendil – 3,055 people
- Pernik – 1,434 people
- Sofia District – 3,355 people
- Total SWR – 8,279 people

If Scenario 2 is implemented, it will have an effect on all districts in the SWR. Given the economic growth parameters thus estimated, this scenario can be assumed to correspond to the realistic version of the multiplier effect, calculated as follows:

49. See Item 7 of Section III

Table 12
Employees in the mining industry and multiplier – Scenario 2

District	Employees in sectors B and D (number)	Conservative estimation of employees in sectors B and D (%)*	Employees in the mining industry (% the total population)	Realistic multiplier scenario (population numbers)	Structural change in employment in the mining industry (employee numbers)
Algorithm for calculation	(1)	(2) = (1)*%	(3) = (1)/(4)%	(4)	(5) = (4)*(2)*(3)
Blagoevgrad	435	0%	0.15%	292,045	0
Kyustendil	3,055	50%	2.94%	103,764	1,525
Pernik	1,434	50%	1.29%	110,626	714
Sofia	3,355	20%	1.59%	211,119	671
Total	**8,279**	**-**	**1.15%**	**717,554**	**2,910**

In summary, the following structural change in employment is expected in sectors B and D in the case of Scenario2:

- Blagoevgrad – no structural change expected
- Kyustendil – 1 530 jobs will be retained, and 1,525 jobs will be lost
- Pernik – 720 jobs will be retained, and 714 jobs will be lost
- Sofia District – 2 684 jobs will be retained, and 671 jobs will be lost
- Total SWR – 4 934 jobs will be retained, and 2,910 jobs will be lost

Scenario 2 will transform the labour market, providing alternative employment to 2,910 people in sectors other than the coal-mining industry.

CONCLUSIONS ON SCENARIO 2

- Scenario 2 presumes holding depopulation in check, preserving the age and gender structure of the population, a somewhat fairer overcoming of the strain on the social insurance system, and maintaining working-age population numbers;
- The generation of new socioeconomic alternatives will ensure sustainable economic growth and thus make the population stay in the region, reconsidering their emigration sentiments. This means that a significant share of those over 1,800 newly redundant workers will move into new employment in the region's labour market;
- Business can rely on stable workforce resources and a better business environment abundant in SMEs offering innovative products and having environmental protection systems in place;
- Social challenges will be mitigated, and the majority of the EU 2030 climate targets will be met, curbing the risk of financial sanctions;
- The districts of Kyustendil, Pernik and Sofia will undergo a socioeconomic transformation, which will enable them to start a sustainable transition to a low-carbon economy;
- Entrepreneurship on the part of micro, small and medium-sized enterprises in alternative sectors will be the primary driver of change in the region's socioeconomic structure, bringing about a new attitude to employment, workforce qualification and social dependence;
- A large part of start-ups will focus on RES-based systems and solutions, high energy efficiency, recyclables and others, directly related to achieving the EU's climate targets;
- Scenario 2 will, to a substantial degree, effectively use the region's competitive advantages and will thus ensure investment sustainability and income security;
- The present scenario will directly drive technology transfer and innovation into SMEs in organisational as well as energy and social terms;
- There are already favourable conditions to start implementing Scenario 2 in Blagoevgrad District; among the remaining districts, Sofia comes closest to this state. The districts of Pernik and Kyustendil will take longest and require the greatest resources to achieve such a state.

RECOMMENDATIONS

Recommendations at the national level

- Bulgaria should as soon as possible sign up for the European processes shaping the targets, policies and funding relating to the just energy transition, such as the Coal Regions in Transition Platform under the Directorate-General for Energy of the European Commission;

- Bulgaria should actively support in the European Parliament the establishment of a new financial instrument for coal regions in the next programming period, 2021-2027;
- Bulgaria should request an urgent review of the European structural and investment funds to ensure funding for the energy transformation and for a just transition, as well as identification of new and sustainable economic solutions and undertaking of immediate actions to solve the issues in the coal sector;
- A National Fund for a Just Transition to a Low-Carbon Economy should be established within the national budget structure, with funding from various sources feeding into it (such as all coal-mining enterprises, all TPPs, carbon emissions sales, etc.);
- Bulgaria should initiate legislative changes to provide for the establishment of a fund for statutory recultivation of land degraded as a result of coal-mining, including a commitment to find investors for the future use of such land;
- Bulgaria should establish a specialised administration to promote the effective transfer of RES energy generation technologies and energy efficiency measures in households and industries;
- The Human Resources Development Operational Programme for the next programming period, 2021-2027, should plan measures aimed at retraining and social adaptation to new economic sectors for the employees who will become redundant in the coal-mining industry;
- All strategic documents relating to regional development should contain a section on climate change, RES and carbon emissions from the perspective of the territory's socioeconomic setup.

Recommendations at the district level

- A coordination council for a just transition should be established under the auspices of the district administration, and such council should assess the current state of all types of territories affected by coal-mining.

Recommendations at the municipal level

- Location-based investment analyses should be developed at the municipal level, with detailed spatial development plans enclosed, to clearly identify investment possibilities;
- Detailed cost/benefit analyses should be developed for all investment proposals to be implemented on municipal land or to utilise grants for projects involving RES and technological upgrades;
- The Municipal Development Plans for the period 2021-2027 should contain an obligatory section on climate change, RES and carbon emissions for the specific municipality concerned from the perspective of the territory's socioeconomic setup;
- Public advocacy campaigns should be conducted to raise awareness of the new economic opportunities and the shift in the situation. All local target groups should be actively involved in order to support the transition.

3. SCENARIO 3 – A 'CREATIVE UPGRADE' INVOLVING OUTSIDE INVESTORS

The present scenario is based on the region's internal development capabilities, coupled with attracting (a) key strategic investor(s) (see the recommendations under Scenario 3) to bring about an accelerated transformation of the socioeconomic setup by significantly changing the structure of gross added value generation and employment. The accelerated development scenario presumes that the existing public infrastructure, industrial sites, land, recultivated degraded land, etc. will be reassigned to new purposes and thus bring about a 'creative upgrade'. This is the most favourable scenario for Southwest Bulgaria, as it builds upon all the assumptions and strengths from Scenario 2 while adding global chain companies capable of driving a transition in sectors where Bulgaria has traditionally been underperforming, such as technology transfer, development of corporate science and product innovation.

Scenario 3 is based on all possible combinations from the SWOT analysis of the region of Southwest Bulgaria (see Figure 17, Combined SWOT analysis). This scenario also takes account of the need to fully meet the EU's decarbonisation targets and environmental requirements.

This scenario presupposes a radical shift away from the current situation through an economic and territorial transformation based on the region's internal advantages, human potential and natural resources and environment, and we therefore refer to that transformation as a 'creative upgrade'. It will completely surmount the economy reliant on coal-mining and coal-burning. Scenario 3 is also based on the fact that the demographic situation currently continues to deteriorate, severely undermining the labour market and the cost-effectiveness of labour, which involves a major risk to population income growth and the related investment. This scenario expects significant internal and external immigration processes and has the capacity to bring about population growth due to positive net migration.

Scenario 3, too, is based on the fact that at this stage of Bulgaria's development, business is structured around family-type micro and small enterprises, which are extremely vulnerable to external factors and which use low- to medium-skilled labour. The workers to be dismissed from the coal-mining industry in the future in the case of an accelerated restructuring of the region will indeed be economically and psychosocially motivated to obtain retraining, shift their work attitude and transfer to lasting employment in other economic sectors. What is more, this scenario provides for opportunities for personal and professional development in medium-sized and large companies with international markets and established corporate practices in place.

The economic growth to be expected in this scenario would exceed 3.5% per annum, potentially indeed outpacing the national-level growth, and thus entirely transform the region's socioeconomic state, demographic trends and investment climate. According to the estimations in Bulgaria's convergence programme for 2018-2021.[50] real GDP growth is expected to be 3.7% to 3.9% per annum. Since this is a national-level forecast and includes the city of Sofia, a growth rate exceeding 3.5% in the Southwest region (not taking the capital city into account) can be considered a substantial achievement. This above-medium or indeed high growth rate can be

50. http://www.minfin.bg/bg/868

considered to restructure the region's economy and is in line with the philosophy and objectives of a just transition to an economy which is based on clean energy and decarbonisation while taking account of social factors and the welfare of the region and its residents.

This scenario of growth based on the region's internal capabilities and advantages is focused on a further development of the workforce employment structure and a thorough internal restructuring into other, more efficient economic sectors and achieving a larger share of RES in energy generation and consumption.

In view of these considerations, this scenario will mainly rely on the assumption of increased internal entrepreneurship on the part of the local population and business, as well as a high increase in foreign direct investment. It does not preclude implementation of the measures and activities from Scenarios 1 and 2 included in the projects under the District Development Strategies and the Municipal Development Plans funded through various donor programmes, local entrepreneurship and local clusters of companies.

In addition[51] the measures and activities under Scenario 2, Scenario 3 includes the following measures and activities, including indicative priority area businesses:

Priority area	Measures			
	Primary sector	Secondary sector	Tertiary sector	Quaternary sector
INNOVATION AND COMPETITIVENESS	• Parallel closure of the coal-mining sector in the region in the short run and transition to RES energy generation • Accelerated transition to RES energy generation • Development of agriculture and forestry ***Indicative businesses:*** *Development of intensive organic agriculture and organic animal farming;* *Alternative agriculture: herbs – lavender, ginseng, goji berry, saffron, etc.*	• Development of the processing industry. Preferential lending to SMEs in the secondary sector. ***Indicative businesses:*** • *Manufacture of 3D printers and related software;* • *Manufacturing related to sustainable mobility – assembly of electric vehicles, car parts for electric vehicles, electric scooters, electric bicycles, electric motorcycles, drones, as well as software for all those products;*	• Development and implementation of a commercial strategy of trade management to the benefit of local producers, focusing on promoting exports rather than imports • Increasing foreign direct investment by transnational corporations • Making former coal-mining or similar industrial sites available free of charge, in return for socioeconomic commitments, with a view to industrial reconversion and use of such land for new purposes, following appropriate rehabilitation of such sites	• Promoting certain economic activities through the so-called industrial strategy[52] • Development of scientific research and innovation in the field of RES ***Indicative businesses:*** *Locating cryptocurrency mining data centres using energy generated from RES;* *A cluster of RES production companies and universities in the region – joint labs, trial centres, experimental sites, etc.*

51. The extra measures and activities are in red text colour.
52. http://www.mi.government.bg/bg/themes/inovacionna-strategiya-za-inteligentna-specializaciya-na-republika-balgariya-2014-2020-g-1470-287.html

		• *Manufacture of waste treatment, reuse and recycling equipment – tyre recycling, waste collection robots, sampling robots, robots for litter collection from water bodies and mountainous areas, landfill operations, waste separation, etc.;* • *Rehabilitation of degraded land and counteracting adverse soil and climate processes such as erosion, deflation, salinization, podsolization, etc.* • *Manufacture of RES components: water heating panels, photovoltaic panels, micro wind turbines, hydropower (surface and underwater currents);* • *Manufacture of appliances and devices equipped with solar panels, such as light fittings, road signs, signboards, souvenirs, signposts, information boards, etc.;* • *Extrusion of bioplastics using waste plastics and wood, including firewood – exterior and interior profiles with various applications in construction and design, etc.*	• Development of tourism through sustainable use of the natural environment and CHH in the region ***Indicative businesses:*** *Theme and amusement parks, including ones built on recultivated land and offering primarily cultural and environmentally friendly experiences, etc.*	
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE			• Viewing human resources as a production factor with highly specialised professional skills involving highly intellectual work and creativity – an obligatory precondition prior to the deployment of new products or services	• Introducing requirements to develop corporate-type science coupled with R&D and production in the region • Social innovation supporting young scientists and others holding a master's or higher degree for joint work with companies based in the region

			• Tax reliefs for medium-sized and large investors provided for recruiting and training highly skilled staff • Provision of basic services to the population, such as housing, transport, healthcare, security and protection options, including social benefits for young families (e.g. additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for pre-school- and school-age children, etc.) • Promoting a flexible labour market through a process of deregulation and a shift from welfare to a system making unemployment benefits conditional on participation in the labour market • Increasing the role of civil society as a mediator between the government and the local population and a business environment moderator • Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following areas: RES, agriculture, forestry, the processing industry, tourism	

			• Providing benefits to micro and small entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc. Preferential lending. • Engaging locals in the local administration's urban and rural development policies and activities – through regular public consultations (local referenda), public discussions of local investment projects, etc. ***Indicative businesses:*** *Development of business incubators and start-up business parks, etc.*	
DECARBONISATION AND ENVIRONMENTAL PROTECTION	• Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land	• Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption; • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials.	• Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-closure use of the land and buildings previously used by the coal-mining and coal-burning sector.	• Development of a circular economy, also through preferential deployment of environmental and resource innovation • Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.

The table below outlines the link between the priority areas and the region's **comparative advantages:**

Priority area	Comparative advantages
INNOVATION AND COMPETITIVENESS	**With a potential for further development of the energy sector:** • Parallel closure of the coal-mining sector in the region in the short run and transition to RES energy generation; • Accelerated transition to RES energy generation **With a potential for development of alternative economic activities:** • Development and implementation of a commercial strategy of trade management to the benefit of local producers, focusing on promoting exports rather than imports; • Increasing foreign direct investment by transnational corporations; • Promoting certain economic activities through the so-called industrial strategy; • Making former coal-mining or similar industrial sites available free of charge, in return for socioeconomic commitments, with a view to industrial reconversion and use of such land for new purposes, following appropriate rehabilitation of such sites; • Development of agriculture and forestry; • Development of the processing industry; • Preferential lending to SMEs in the secondary sector; • Development of scientific research and innovation in the field of RES **Necessary to maintain and develop the local economy:** • Development of tourism through sustainable use of the natural environment and CHH in the region
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**With a potential for further development of the energy sector:** • Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the RES area **With a potential for development of alternative economic activities:** • Viewing human resources as a production factor with highly specialised professional skills involving highly intellectual work and creativity – an obligatory precondition prior to the deployment of new products or services; • Tax reliefs for medium-sized and large investors for recruiting and training highly skilled staff; • Provision of basic services to the population, such as housing, transport, healthcare, security and protection options, including social benefits for young families (e.g. additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for pre-school- and school-age children, etc.); • Promoting a flexible labour market through a process of deregulation and a shift from welfare to a system making unemployment benefits conditional on participation in the labour market; • Increasing the role of civil society as a mediator between the government and the local population and a business environment moderator; • Introducing requirements to develop corporate-type science coupled with R&D and production in the region; • Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following areas: agriculture, forestry, the processing industry, tourism; • Providing benefits to micro and small entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc. Preferential lending;

	• Social innovation supporting young scientists and others holding a master's or higher degree for joint work with companies based in the region. **Necessary to maintain and develop the local economy:** Engaging locals in the local administration's urban and rural development policies and activities – through regular public consultations (local referenda), public discussions of local investment projects, etc.
DECARBONISATION AND ENVIRONMENTAL PROTECTION	**With a potential for further development of the energy sector:** • Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption; • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials; • Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc. **With a potential for development of alternative economic activities:** • Development of a circular economy, also through preferential deployment of environmental and resource innovation; • Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land. **Necessary to maintain and develop the local economy:** • Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials; • Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-closure use of the land and buildings previously used by the coal-mining and coal-burning sector; • Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.

The table below outlines the link between the priority areas and the region's comparative advantages:

Priority area	Competitive advantages of the region based on Porter's Diamond
INNOVATION AND COMPETITIVENESS	**'Firm strategy and rivalry' group** • The favourable geographic location of the region[55]; • The proximity and fast access to the capital city **'Factor conditions' group** • Administrative infrastructure[56]; • Scientific and technological infrastructure; • Financial resources; • Physical infrastructure; • Information infrastructure; • Natural resources; • Scientific and technological infrastructure **'Related and supporting industries' group** • Development of industries interconnected in a competitive way based on the region's technological and sectoral specialisation; • A network/clusters of capable, locally based suppliers; • Investment in industries/services based on comparative advantages **'Demand conditions' group** • Providing for the goods and services needs to support the newly established primary and auxiliary productions/services; • Improving income and the quality of life through mastering specific products and new market niches; • Generating uncustomary local demand in specialised segments, such as generation and consumption of RES power in the ICT sector, ICT outsourcing for trans-national corporations (TNCs) and others, alternative agriculture and tourism
IMPROVING THE QUALIFICATIONS AND INCOME OF THE WORKFORCE	**'Firm strategy and rivalry' group** • The proximity and fast access to the capital city; • The favourable geographic location of the region **'Factor conditions' group** • Scientific and technological infrastructure; • Administrative infrastructure; • Human resources **'Related and supporting industries' group** • Development of industries interconnected in a competitive way based on the region's technological and sectoral specialisation; • A network/clusters of capable, locally based suppliers **'Demand conditions' group** • Generating uncustomary local demand in specialised segments, such as generation and consumption of RES power in the ICT sector, ICT outsourcing for trans-national corporations (TNCs) and others, alternative agriculture and tourism • Improving income and the quality of life through mastering specific products and new market niches

55. The green text indicates what is more compared to Scenario 1
56. The red text indicates what is more compared to Scenario 2

DECARBONISATION AND ENVIRONMENTAL PROTECTION	**'Firm strategy and rivalry' group** • The proximity and fast access to the capital city; • The favourable geographic location of the region **'Factor conditions' group** • Scientific and technological infrastructure; • Natural resources; • Financial resources; • Information infrastructure; • Physical infrastructure **'Related and supporting industries' group** • Development of industries interconnected in a competitive way based on the region's technological and sectoral specialisation; • Investment in industries/services based on comparative advantages **'Demand conditions' group** • Providing for the goods and services needs to support the newly established primary and auxiliary productions/services; • Generating uncustomary local demand in specialised segments, such as generation and consumption of RES power in the ICT sector, ICT outsourcing for trans-national corporations (TNCs) and others, alternative agriculture and tourism

Scenario 3 is deemed to require twice the financial resources required for Scenario 2, as it is based on the assumptions of Scenario 1, which relies on the measures and activities planned in the District Development Strategies and the Municipal Development Plans, as well as on Scenario 2, which involves business entrepreneurship, and complements the above with large external investors. Attracting large companies of the high-tech and high-added-value sectors requires setting up new public infrastructure[57], which has not been available by now or is at a rudimentary stage of development. Based on this assumption, the required investment is expected to be twice as large as the Scenario 2 investment; on the other hand it will bring about pace-setting economic growth.

The indicative financial resources are distributed by priority area and by source as follows:

57. Example – Intermodal transport terminals, internet

Table 13
Distribution of the indicative financial resources by source – Scenario 3

Priority area	Measures	Financial resources (BGN)			
		EU programmes and other donor programmes	National public funding	Private investment, incl. loans	Total (BGN)
Innovation and competitiveness	Parallel closure of the coal-mining sector in the region in the short run and transition to RES energy generation	900,000,000	200,000,000	2,900,000,000	4,000,000,000
	Accelerated transition to RES energy generation				
	Development of agriculture and forestry				
	Development of the processing industry. Preferential lending to SMEs in the secondary sector				
	Development and implementation of a commercial strategy of trade management to the benefit of local producers, focusing on promoting exports rather than imports				
	Increasing foreign direct investment by transnational corporations				
	Making former coal-mining or similar industrial sites available free of charge, in return for socioeconomic commitments, with a view to industrial reconversion and use of such land for new purposes, following appropriate rehabilitation of such sites				
	Development of tourism through sustainable use of the natural environment and CHH in the region				
	Development of scientific research and innovation in the field of RES				
	Promoting certain economic activities through the so-called industrial strategy				

Improving the qualifications and income of the workforce	Viewing human resources as a production factor with highly specialised professional skills involving highly intellectual work and creativity – an obligatory precondition prior to the deployment of new products or services	500,000,000	50,000,000	450,000,000	1,000,000,000
	Tax reliefs for medium-sized and large investors provided for recruiting and training highly skilled staff				
	Provision of basic services to the population, such as housing, transport, healthcare, security and protection options, including social benefits for young families (e.g. additional childbirth lump sum payments of at least BGN 10,000 per child in return for a commitment to stay in the region for a period of 5 years, subsidising out-of-class activities for preschool- and school-age children, etc.)				
	Promoting a flexible labour market through a process of deregulation and a shift from welfare to a system making unemployment benefits conditional on participation in the labour market				
	Retraining of the working-age workforce previously engaged in the coal-mining and coal-burning sector for the following areas: RES, agriculture, forestry, the processing industry, tourism				
	Providing benefits to micro and small entrepreneurs, such as free office spaces in renovated buildings of former industrial plants, tax reliefs for periods of 2 to 5 years, etc. Preferential lending.				
	Introducing requirements to develop corporate-type science coupled with R&D and production in the region				
	Increasing the role of civil society as a mediator between the government and the local population and a business environment moderator				

Decarbonisation and environmental protection	Development of a circular economy, also through preferential deployment of environmental and resource innovation	300,000,000	50,000,000	2,650,000,000	3,000,000,000
	Recultivation of land after the closure of coal-mining and coal-burning industries, involving also the previous users of such land				
	Technological upgrades of all secondary-sector production to reduce primary and secondary energy consumption;				
	Technological upgrades of machinery and the technologies applied, in order to reduce the use of non-renewable primary raw materials and increase the share of recycled materials				
	Development of a circular economy, also through preferential deployment of environmental and resource innovation				
	Development of laboratories and research centres working to improve the energy efficiency of residential and administrative buildings, small-scale manufacturers, greenhouse systems, etc. and thus achieve passive buildings, energy passive small-scale manufacturing, etc.				
	Establishing partnerships between the administration, academia, business and the NGO sector to ensure the optimal post-closure use of the land and buildings previously used by the coal-mining and coal-burning sector				
	Total	**1,700,000,000**	**300,000,000**	**6,000,000,000**	**8,000,000,000**

a. Expected socioeconomic effect of Scenario 3

Based on the multiplier effect determined for the separate districts and the SWR, it is estimated[58], that employee numbers in sector B, the Mining (including coal-mining) sector, and sector D, Production and distribution of electrical and thermal energy and gaseous fuels, are as follows:

- Blagoevgrad – 435 people
- Kyustendil – 3,055 people
- Pernik – 1,434 people
- Sofia District – 3,355 people
- Total SWR – 8,279 people

If Scenario 3 is implemented, it will have an effect on all districts in the SWR. Given the economic growth parameters thus estimated, this scenario can be assumed to correspond to the optimistic version of the multiplier effect, calculated as follows:

Table 14
Employees in the mining industry and multiplier – Scenario 3

District	Employees in sectors B and D (number)	Conservative estimation of employees in sectors B and D (%)*	Employees in the mining industry (% the total population)	Adjusted optimistic multiplier scenario (population numbers)	Realistic multiplier scenario (population numbers)	Structural change in employment in the mining industry (employee numbers)
Algorithm for calculation	(1)	(2) = (1)*%	(3) = (1)/(4)%	(4)	(5) = (4)*(2)*(3)	(6) = (4)*(2)*(3)
Blagoevgrad	435	0%	0,15%	437 063	292 045	0
Kyustendil	3 055	50%	2,94%	158 306	103 764	2 327
Pernik	1 434	50%	1,29%	166 602	110 626	1 074
Sofia	3 355	20%	1,59%	317 942	211 119	1 011
Total	**8 279**	**-**	**1,15%**	**1 079 913**	**717 554**	**4 412**

In summary, the following structural change in employment is expected in sectors B and D in the case of Scenario3:

- Blagoevgrad – no structural change expected
- Kyustendil – 728 jobs will be retained, and 2,327 jobs will be lost
- Pernik – 360 jobs will be retained, and 1,074 jobs will be lost
- Sofia– 2 344 jobs will be retained, and 1,011 jobs will be lost
- Total SWR – 3 432 jobs will be retained, and 4,412 jobs will be lost

Scenario 3 will completely transform the labour market, providing alternative employment to 4,412 people out of coal-mining and its related industries and into other, high-added-value sectors.

58. See Item 7 of Section III

CONCLUSIONS ON SCENARIO 3:

- Scenario 3 presumes population growth due to positive net migration, an improved age and gender structure of the population, a fair overcoming of the strain on the social insurance system, and increasing working-age population numbers;
- The generation of new socioeconomic alternatives will ensure sustainable economic growth which will bring about population growth in the region and contribute to positive immigration sentiments. This means that all those over 4,400 newly redundant workers will move into new employment in the region's labour market, and a significant share of them will work for international companies;
- Business can rely on growing workforce resources and a favourable business environment abundant in both SMEs and large companies offering innovative products and new high-tech productions and having environmental protection systems in place;
- Social challenges will be overcome, and the EU 2030 climate targets will be fully met, eliminating the risk of financial sanctions;
- The districts of Kyustendil, Pernik and Sofia will undergo a socioeconomic transformation, which will enable them to start a sustainable transition to a low-carbon economy. The district of Blagoevgrad will enjoy development outpacing the average national levels. The city of Blagoevgrad will reaffirm its position as the regional economic hub in the SWR;
- Entrepreneurship on the part of micro, small and medium-sized enterprises in alternative sectors, as well as large investors in high-tech and high-added-value sectors, will be the primary drivers of change in the region's socioeconomic structure, bringing about an entirely new type of employment, with income primarily dependent on staff qualifications, while social dependence will be overcome;
- A large part of start-ups will focus on systems and solutions based on R&D, new technology and RES, high energy efficiency, recyclables and others, directly related to achieving the EU's climate targets;
- Scenario 3 will make full use of the region's competitive advantages as defined in Porter's Diamond, and will thus ensure investment sustainability and income security in the long run;
- The present scenario will directly drive technology transfer and innovation into SMEs and large companies alike, both in organisational and in energy and social terms, and will bring about cluster networks and corporate-type science directly applicable in business.

RECOMMENDATIONS

Recommendations at the national level[59]

- Legislative changes should be initiated in relation to identifying and attracting strategic investors which will give priority to developing business activities on land rehabilitated and recultivated after coal-mining;
- A package of tax relief and other preferential treatment measures should be set up (e.g. for attracting highly skilled workforce, further qualification of staff, etc.) with a territorial focus on municipalities in whose territory coal-mining and related industries were previously developed;
- Bulgaria should as soon as possible sign up for the European processes shaping the targets, policies and funding relating to the just energy transition, such as the Coal Regions in Transition platform under the Directorate-General for Energy of the European Commission;
- Bulgaria should actively support in the European Parliament the establishment of a new financial instrument for coal regions in the next programming period, 2021-2027;
- Bulgaria should request an urgent review of the European structural and investment funds to ensure funding for the energy transformation and for a just transition, as well as identification of new and sustainable economic solutions and undertaking of immediate actions to solve the issues in the coal sector;
- A National Fund for a Just Transition to a Low-Carbon Economy should be established within the national budget structure, with funding from various sources feeding into it (such as all coal-mining enterprises, all TPPs, carbon emissions sales, etc.);
- Bulgaria should initiate legislative changes to provide for the establishment of a fund for statutory recultivation of land degraded as a result of coal-mining, including a commitment to find investors for the future use of such land;
- Bulgaria should establish a specialised administration to promote the effective transfer of RES energy generation technologies and energy efficiency measures in households and industries;
- The Human Resources Development Operational Programme for the next programming period, 2021-2027, should plan measures aimed at retraining and social adaptation to new economic sectors for the employees who will become redundant in the coal-mining industry;
- All strategic documents relating to regional development should contain a section on climate change, RES and carbon emissions from the perspective of the territory's socioeconomic setup.

59. Texts in red show the superstructure above Scenario 2

Recommendations at the district level

- Through legislative changes, district administrations should be empowered with regard to the process of locating key investors and providing support during the investment process;
- A coordination council for a just transition should be established under the auspices of the district administration, and such council should assess the current state of all types of territories affected by coal-mining.

Recommendations at the municipal level

- Location-based investment analyses should be developed at the municipal level, with detailed spatial development plans enclosed, to clearly identify investment possibilities;
- Detailed cost/benefit analyses should be developed for all investment proposals to be implemented on municipal land or to utilise grants for projects involving RES and technological upgrades;
- The Municipal Development Plans for the period 2021-2027 should contain an obligatory section on climate change, RES and carbon emissions for the specific municipality concerned from the perspective of the territory's socioeconomic setup;
- Public advocacy campaigns should be conducted to raise awareness of the new economic opportunities and the shift in the situation. All local target groups should be actively involved in order to support the transition.

PART V. CONCLUSION

The transition to a low-carbon economy in Europe is no longer just a possibility. It is already happening in practice, with transformation processes in the energy sector having been occurring for more than a decade now. Society can choose whether to remain passive and resist the transition, or be pro-active and pursue policies to steer the economic growth of Bulgaria.

Workers in the energy and coal-mining industries as well as their trade unions are facing a serious challenge. On the one hand, they will have to bear a large share of the burden involved in the transition to a sustainable economy. A large number of jobs will be transformed – a process already occurring due to the modernisation and upgrade of current industrial technologies. On the other hand, trade unions, as the driving force of social change, have the deepest insight in the potential and the benefits of collective action. Unless they exert their influence in the high-carbon sectors in order to accelerate and effectively support the modernisation and upgrade processes during the transition to a low-carbon economy, a large number of jobs are at risk of being lost in the short run. We are already facing this process in Southwest Bulgaria.

IMPLEMENTATION OF THE PARIS AGREEMENT COULD CREATE **2 MILLION** JOBS IN EUROPE

The concept of a 'just transition' enables a responsible and fair transition to a low-carbon economy taking care of those at risk of losing their income, especially workers in the energy and coal-mining industries. The burden of this transition should be distributed between and amongst all stakeholders, with accountability and opportunities being the driving principles. This is the only possibility to achieve a transition to a sustainable economy that is equitable in relation to both people and the environment.

Decarbonisation policies and measures can in practice turn into a driver of sustainable economic growth and social progress. This may well involve the active participation of those employees and workers who are most directly affected. The present study touches upon a number of alternative ways of bringing about a just transition in Southwest Bulgaria. It outlines the possible scenarios of sustainable development beyond maintaining the current situation (i.e. beyond failing to take specific actions for change).

The first scenario – the scenario of maintaining the status quo – is anything but adequate to bring about changes in the region's socioeconomic state, demographic trends and investment climate. It will arguably lead to a disorderly closure of the energy and coal-mining industry in its current form, which is not in line with the objectives of a just transition to an economy which is based on clean energy. Such a development of the situation is not to be recommended.

The second scenario – the one based on the region's internal advantages and capabilities – involves an economic and territorial transformation. Such transformation is to outgrow coal-mining and coal-burning while preserving the regional economy. This scenario comes closer to the objectives of a just transition.

The third scenario – the scenario of a 'creative upgrade' involving external investors – is the one most beneficial for the region of Southwest Bulgaria. This scenario involves a thorough economic and territorial transformation, reversing the negative demographic trends and establishing a favourable investment climate – all of which can be the drivers of a just transition.

Whichever route is chosen, it will be long and will require the efforts of not only those directly employed in the coal-mining and coal-burning sector but also the state, business, trade unions, regions and the NGO sector.

This study is intended to become the basis for an active public discussion that will catalyse solutions of a high intellectual level, based on the region's advantages. Those solutions should overcome the territory's gradual depopulation and loss of identity and bring about the formation of prosperous and attractive areas for the development of sustainable economic activities.

This study is no panacea, it does not identify all possible solutions or propose all possible measures and actions to be taken, as they cannot be exhausted within a single document. Yet it is a necessary start for the process of transition to an economy based on clean energy and driving a new kind of growth.

'Lack of ambition and lack of action is the fuel for our own destruction...

Just Transition can be the driver of ambition.

Sharan Burrow,
General Secretary of the International Trade Union Confederation

PART VI.
LIST OF REFERENCES

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