



Za Zemiata
Friends of the Earth Bulgaria

A PRELIMINARY ANALYSIS

November 2018

JUST TRANSITION IN BULGARIA –

**Mission possible for Maritsa Iztok
energy complex?**

Photos

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The **purpose** of this analysis is to make a first assessment of the opportunities for a Just Energy Transition (JT) in the heart of Bulgarian coal mining and coal energy industry – the region known as Maritsa Iztok energy complex (MIEC). The analysis makes the following assumptions:

1. Cutting down the use of highly polluting energy carriers, such as coal, is a long-term process, which is well under way in some countries of the European Union.
2. This process is an opportunity for EU and its Member States to re-orient their policies and energy systems, taking advantage of the latest achievements in high technology (Economy 4.0), in order to mitigate the negative impacts of the transition, while achieving maximum benefit for all involved.
3. Decisions related to just transition in each Member State are to be taken in view of the specific local conditions and administrative and legal systems and practices, however in keeping with the framework of the global European Energy and Climate policy decisions. Those decisions should be taken by means of discussion and negotiation; no energy and political ‘wars’ between groups of countries in the EU will be tolerated.

Description of Maritza Iztok energy complex

Maritza Iztok energy complex (MIEC)¹ includes three lignite pit mines (Maritza Iztok Mines), four coal-fired power plants (CFPPs) that generate electricity, a briquette production factory, as well as the production, warehouse, logistics, etc. facilities of dozens of businesses related to the mining and power plant operations.

- Maritsa Iztok Mines EAD (MI Mines) cover an area of 209 square kilometers² (according other sources, nearly 240 square kilometers³) located on the territories of Radnevo and Galabovo municipalities in Stara Zagora administrative region. The coal extracted from the three open pit mines (Trojanovo 1, Trojanovo 3 and Trojanovo Sever) is used as fuel for electricity generation by the CFPPs in the complex, as well as for Maritza 3 CFPP in Dimitrovgrad. MI Mines is 100% state-owned and is structurally part of the Bulgarian Energy Holding (BEH).
- Brikel EAD includes the remnants of the obsolete Maritza Iztok 1 CFPP, a briquette factory and a district heating plant. Brikel EAD produces mainly heat energy for drying coal, which is then processed into briquettes or used by other power plants (e.g. Bobov dol CFPP), as well as for providing district heating for the town of Galabovo.
- US-based company AES, through three companies registered in Bulgaria, is the owner and operator of the newly-built Maritsa Iztok 1 CFPP and the disposal site for the waste from its operations.
- Maritsa Iztok 2 EAD CFPP is owned by the Bulgarian state, which performs its ownership function through BEH.
- Contour Global and the National Electricity Company (NEK) are co-owners (73:27) and operate the Maritsa Iztok 3 CFPP together.
- Maritsa 3 CFPP in Dimitrovgrad is totally dependent on the coal produced at MI Mines, which is why it is also included in this analysis, although it is not located on the territory of the Maritsa Iztok energy complex.

The coal extracted and used by the CFPPs has the following characteristics: ash content 25-45%, total moisture content 58%, combustible mass 55-60% and calorific value of 6485 kJ/ kg (1550 kcal/kg).⁴

1 Throughout this text the name "Maritza - East Complex" will be used to mean the territory encompassing the concession territory of Maritsa Iztok mines, as well as the sites of Brikel, AES, Maritza-Iztok 2 and Contour Global coal-fired power plants.

2 Data from the National register of concessions (NRC): <http://nkrold.government.bg/app?service=external/ConcessionInfo&sp=1252>

3 Bulgarian Energy Holding: <https://bit.ly/2OmBWFn>

4 Maritsa Iztok Mines EAD website: <http://www.marica-iztok.com/page/vaglishta-10-1.html>; Maritsa 3 CFPP website: http://tec-marica3.com/?act=show_page&category_id=2

The latest available data about the number of people directly employed in the main production capacities in the MI complex (mines and power generation) are shown in Table 1 below.

Table 1. Number of people directly employed in mining and power generation in MIEC

Company	Capacity (MWt)	Employees (2017)	Assets (in thousands of BGN, 2016)	Profit (in thousands of BGN, 2016)
Maritsa Iztok mines EAD	N/a	7304	2 141 518	37 824
AES Maritsa Iztok 1 EOOD		114	125 097	20 535
AES– 3S Maritsa Iztok 1 EOOD	690 (2 x 345)	2*	2 038 021	104 443
AES – Maritsa Iztok 1 Services EOOD		303	9174	618
Maritsa Iztok 2 CFPP EAD	1624 (3 x 177, 1 x 165, 4 x 232)	2435	1 601 713	–98 441
Contour Global Operations Bulgaria AD (CFPP MI 3)	908 (4 x 227)	425	14 663	4805
Contour Global Operations Maritsa Iztok 3 AD		43		
Brikel EAD	120 (2 x 60)	1297	271 455	16 097
Maritsa 3 CFPP (Dimitrovgrad)	120 (1 x 120)	300 - 350??		

*2016, Sources: Stara Zagora Chamber of Trade and Industry – Yearbook 2018; media publications about Maritsa 3 CFPP

The total number of 11 900-12 000 employees listed above includes people employed in the mines and the CFPPs in the MIEC, as well as ca. 300-400 employees at the Maritsa 3 CFPP.

Also of interest is information about the companies directly related to the main production, e.g.: raw materials suppliers, materials and equipment, repair, installation and maintenance, transport services, suppliers of other goods and services (working clothes, food and beverages, insurance, medical services, etc.) Table 2 below presents information about several of the larger ones.

Table 2. Service providers, goods suppliers and other businesses related to the key coal industries in MIEC

Company	Employees (2017)	Assets (in thousands of BGN, 2016)	Profit (in thousands of BGN, 2016)
Energoremont – Galabovo AD	802	18397	
Metalik AD	568	83369	197
Peshtostroy EOOD	214		2139
Energoremont – Radnevo EOOD	171		711
Metalinvest-Remko EOOD	142		2580
Maritsa Iztok Avtotransport EOOD	75		293
ET Ilia Iliev-Svedi	55		1278
Montazhinzhenening AD	53		334
Ritum – 4TB OOD	38	94090	–1197
GU-Faradei EOOD	25		–469

Certainly, service companies have clients other than Maritza Iztok. For example, Energoremont - Galubovo works with Steinmüller Babcock Environment, Hitachi Zosen Inova, General Electric and Siemens.⁵ Hospitals in the region serve the rest of the population as well; transport companies operate bus routes between settlements or public transport in towns, and so on. This diversification is a mitigating factor in the future transition.

What is to be highlighted is the diversity of factors that affect revenues, costs and final annual results for both MIEC companies and related manufacturers and suppliers of goods and services. The main ones are:

- the regulated prices for the electricity of Maritsa Iztok 2 CFPP and Maritsa 3 CFPP, and for Brikel's electricity and heat, which influence the relationships of energy producers with Maritsa Iztok Mines and suppliers of goods and services.
- AES's and Contour Global's long-term contracts, which to some extent determine the price of the National Electricity Company's energy mix;
- emission quotas that have risen from 5-6 euro / tonne to over 16-20 euro / tonne CO₂ in the last 12 months (2017-2018).
- the fluctuation of labor costs in the region, which is determined by various factors: general economic development, demographic status, foreign direct investment, degree of 'openness' (export-import) of the regional economy, the presence / absence of trade union activity, etc.

Regarding secondary employment factor for suppliers – the number of jobs created by one job in the MIEC – currently reference can be made to just one source, a publication by the Institute for Market Economy (IME), according to which: "*The factor of employment generated by the CFPP [Contour Global Maritza Iztok 3] with suppliers mainly from Stara Zagora region is over 2 - about 1 100 people per month.*"⁶ Assuming, with all due considerations, that this factor applies to the entire MIEC, secondary employment associated with MIEC in the region is estimated to amount to 14 000 jobs or 21-22 000 jobs, depending on whether the IME factor includes or not the Maritsa Iztok Mines as 'induced jobs at suppliers of CFPPs'. However, it must be immediately added that there are facts which suggest that the factor of 2 is highly overestimated and that the final assessment should be made separately for each of the major companies.

In light of the above, the data used in this analysis are for information purposes only and do not necessarily reflect trends. The analysis of available data shows that companies in the region very easily switch from profit to loss and vice versa.

Socio-economic status in the Stara Zagora region

Approximately 158 000 people live on the territory of Stara Zagora Municipality. Additional 139 000 people live in the immediate vicinity of the city of Stara Zagora (30 minutes' drive to the city center), out of whom 80 000 people are between 20 and 64 years of age. The city is accessible in under 45 minutes for 114 000 more people. Therefore the total population of the Stara Zagora broader region amounts to 411 000 people⁷. Of these over 410 thousand inhabitants, 79% live in the Stara Zagora administrative region and the rest in the Haskovo and Sliven regions.

Over the last four years (2015-2018) there has been an increase in economic performance and a decrease in unemployment.⁸ According to Stara Zagora-based institutions and businesses, there is shortage of labour in the region, which creates two trends: (a) relocation of businesses to neighboring

5 Capital online: https://www.capital.bg/biznes/kompanii/2018/06/18/3201531_energoremont-gulubovo_investira_3 mln leva_v_nova/

6 <https://ime.bg/bg/articles/tec-varna-marica-iztok-1-i-3-i-ikonomikata-na-bylgariya/>

7 Stara Zagora region Economic Yearbook 2018, edition of Chamber of trade and industry - Stara Zagora, ISSN 1311-9494: <http://www.chambersz.com/doc/YB-2018.pdf>

8 National Statistics Institute, Economic Yearbook of Stara Zagora region 2018, media

regions; and (b) a noticeable increase of salaries. Rents in Stara Zagora are additionally affected, marking a higher increase for private housing and a lower increase for business.

The observed economic growth is due both to the energy sector located in the MIEC and the military industry in the Kazanlak region, as well as to the processing, services and construction sectors.

A relatively negative tendency is observed in labour remuneration levels in the region, where, apart from the high salaries in the MIEC and the military factories, the average (net) monthly salary in the other sectors is between BGN 600 - 900 (307 – 460 euro) for Stara Zagora and even lower for other towns and villages. At the same time, according to a survey among employers from the processing industry, whose results are published in the Yearbook of CTI - Stara Zagora, their gross labor costs vary from 780 to 1550 euro per month for experienced workers. It is important that such significant discrepancies are taken into account in further analyses, which will serve as the basis for developing strategies for just transition in the region.

Regional and national significance of the Maritsa Iztok Mines

In 2017 the company Maritsa Iztok Mines EAD produced 30,337 million tons of coal.⁹ This coal forms the basis for about 30% of the total electricity generation in Bulgaria. The three main CFPPs at MIEC provide 25-35% of the electricity used in Bulgaria.

Apart from the production of electricity, the MIEC power plants are also involved in the supply of balancing energy. Maritza-Iztok 2 CFPP was until recently providing the so-called ‘cold reserve’. Maritza 3 CFPP also provides ‘cold reserve’.

Table 3. Capacity and electricity sold to the grid by the MIEC power plants

CFPP	Gross capacity (MWh)	Sold to the grid / national electricity system (MWh)
AES– 3S Maritsa Iztok 1		2 500 000 – 3 000 000
Maritsa Iztok 2 CFPP	8 931 552,73	7 685 524,44
Contour Global Maritsa Iztok 3		4 158 000
Brikel	558 437	386 737
Maritsa 3 CFPP		ca. 200 000

Sources: Companies' Annual Reports, institutional reports, Media

Just transition: Opportunities in the region

In order to achieve a just energy transition in the region which currently depends on Maritza Iztok energy complex several basic steps need to be taken:

- First of all is the adoption of a strategic document on the future of MIEC and the surrounding region, as part of a national strategy for reducing dependence on polluting energy (coal). In turn, this national strategy for reducing dependence on coal should be **an integral part** of a National Energy Strategy by 2030 and beyond.
- Secondly, there is a need to assess the opportunities for business development and for redeployment of dismissed workers, both in the immediate vicinity of the MIEC and its neighbouring regions.
- Thirdly, it is necessary to include these assessed opportunities for a just transition process in the strategic documents for the development of the South-East and South-Central development regions (NUTS II), as well as the affected areas (NUTS III) and municipalities (NUTS IV).
- Fourthly, the immediate implementation of these strategic documents should begin as soon as they are adopted.

⁹ <http://www.marica-iztok.com/news/godishen-dobiv-ot-30-337-319-tona-vaglishta-za-2017-g-592.html>

The swift development and adoption of a **Coal Mining Strategy** with clear deadlines is a mandatory initial stage of the just transition process. Such a strategy would guarantee predictability of the process, gradual progress and clarity about the necessary and available financial resources at all times. In this way businesses will have time to re-orient their focus in view of the changing situation and work out their own strategies for future development. Employees will have time to make personal life plans for alternative work or retirement. Institutions will also have clear deadlines for action in terms of creating the necessary regulatory documents, support programs and financial instruments, including public funds.

It is the author's opinion, and one shared by nearly all interviewed and surveyed respondents, that such a strategy should be adopted as soon as possible. People see the benefit of a strategy for phasing out coal-mining, apart from the reasons mentioned above, also because the existence of such a document would allow for a smooth transition, without sudden shocks due to internal or external pressure. This can prevent the serious social problems that follow from sudden large-scale dismissal of employees, as well as the consequent negative impact on the National Social Security Institute (NSSI) and the pension insurance system.

Without going into details on the content of such a strategy, the following two points must be noted:

- The clear understanding among most of our respondents that in order to meet the environmental requirements and protect human health and lives, along with the negotiations for derogations, it is necessary to close down the most polluting installations in the short term. In Bulgaria these are Brikel, Maritza 3 (Dimitrovgrad) and Bobov dol CFPP. Various commitments for closure of these installations were made already in Bulgaria's EU Accession Treaty from 2006. Meanwhile, over the years the continued operation of these power plants has been repeatedly found to breach the requirements of various environmental protection-related EU Directives.
- From the point of view of securing a reserve of fuels and capacities against future risks of a *force majeure* (e.g. a major disruption in energy supply or capacity shortage), as well as in terms of financially securing this reserve, the strategy should include the 'conservation' of a few mining sites with proven reserves, together with maintaining about 1500 MB of electricity generating capacity in a stand-by regime. This resource should be kept as a long-term reserve against natural and / or industrial disturbances with long-lasting consequences, and should not serve as seasonal 'cold reserve', as is the current situation.

Some representatives of business circles share the notion that Bulgaria needs to make some sort of "alliance" with countries such as Poland, the Czech Republic, Germany, etc. which also generate a high percentage of coal power, in an attempt to achieve long-term derogations for the coal-fired power plants in these countries.

We believe that such a strategy would be wrong and would bring more damage to Bulgaria for the following reason. Poland is far more dependent on coal energy than Bulgaria. Therefore, the relative losses for Bulgaria in a smooth just transition will be much smaller and more easily compensated or substitutable than in Poland. This conclusion is based on evidence from the Czech Republic, a country with a comparable dependence on coal-fired power, where the process of closure of coal mines has started since 1991. The second fact that warrants this conclusion is the closure and decommissioning of Units 1-4 of the Kozloduy Nuclear Power Plant, a process running since 1992, which took 10 years of meaningless resistance and loss of real and potential resources, before it was completed.

Since derogations will be negotiated on a case-by-case basis (individually for each facility), we recommend against taking the approach of intra-EU political battles between blocs of Member States which would be tantamount to suicide for the entire European Union. This kind of 'war' is capable of diverting the attention of institutions and businesses from the fact that, irrespective of the outcome, they only serve to postpone the processes, while costing a great deal of resources. Our recommendation is to

use the approach of seeking a strategic solution outlined here, which, among other things, will have the benefit of attracting external public and private financial resources.

A detailed analysis of the opportunities for just transition must be carried out for the entire region. According to our estimates the region includes not only the territory of Stara Zagora administrative region, but also parts of Haskovo, Sliven and Yambol regions. Individual effects could be expected as far as Plovdiv, Kardzhali and Burgas regions. However, in order for the results of the analysis to be applied in practice, they must be implemented in two levels:

- On sectoral level - in the Coal Mining Strategy. The information needs to show primarily how the processes of downsizing and closure of coal mining and coal-based energy generation are interlinked with socio-economic processes, including re-training, training and finding jobs for the dismissed employees, as well as with the presence not only of public but also of private resources.
- At the local level - in the above-mentioned strategic documents outlining the development of NUTS regions, levels II, III and IV. A synergistic effect will be achieved when all affected municipalities and regions will have jointly defined and accepted targets for just transition for the people and the economy that are currently dependent on the MIEC, since they will need to act and mobilize the relevant resources for their implementation.

To assess opportunities for business development and redeployment of workers in the process of reducing energy and coal production from the MIEC is an intricate and complex task. Currently we'll need to settle for only preliminary and approximate analyses, evaluations and conclusions and the most important reasons for this are two: lack of a coal strategy and lack of reliable (trustworthy) information on the specific status of business (starting state) and the long-term projected development of the region. Therefore, this text merely outlines possible options and makes some general forecasts without going into depth. To that end, we shall try to evaluate some of the available assets and anticipate opportunities for future investments, that is, to outline some of the region's competitive advantages.

Demographics (labor, employment, unemployment)

As already stated, the demographic structure of the population and its distribution currently favours economic development of the region under the existing production structure. At present business in the region is stable and generates high employment at around average-to-high incomes for employees. According to the Mayor of Stara Zagora, unemployment in the city by mid-2018 is 2.6%, compared to 5.6% (7% in 2017) in the Southeast region of the country.

However, the demographic characteristics of the population employed at the MIEC coming from the Stara Zagora administrative and broader region, show that the prospects of new workers entering the labor market as a result of the natural fluctuation of the population are not favorable.¹⁰ In other words, if it relies solely on its own population growth, the region will have trouble with labour shortage in the coming decades. Considering the perspective of redirecting MIEC workers to other jobs, this is a favorable factor, as it means less competition on the regional labor market. These mathematical calculations, however, need to be cross-referenced with other factors in order to assess the extent to which there is reason to expect an easier or more difficult adaptation of the potential new job-seeker.

Land (Business plots)

Overall, current prices for purchasing or renting land for economic (production, logistics, etc.) activity in the region of Stara Zagora, Radnevo and Galabovo, are relatively low, compared with other economic centers in Bulgaria and very low, compared to international economic centers.

Land sell prices (sq.m.)

¹⁰ Own calculations based on data from the National Statistics Institute (up to and including 2017)

Land for industrial purposes 20 - 30 euro
Built-up industrial areas 350 - 550 euro
Agricultural land 10 euro

Rent prices (sq.m.)

Industrial hall 2.2 - 2.5 euro
Industrial office 1.5 – 2.5 euro
Warehouse 1.5 - 3.0 euro
Office in business building 7.0 - 8.0 euro

To date, the following territories are identified that could be used for starting a new venture or expanding an existing business:

- Industrial Zone "Zagore" (in development) has just received BGN 3.5 million for a joint venture with the national company Industrial Park EAD. A detailed land use plan, a zoning plan and a development plan are being elaborated. Once the documents are approved, the negotiation process with potential investors can begin, as well as the construction of relevant infrastructure (electricity, water supply, etc.). Investors are required to develop high-tech, high value-added industries so as to ensure higher wages.¹¹ Evidently Stara Zagora municipality considers Zagore industrial zone a pilot project – a model for developing industrial zones with pre-built infrastructure. The area is located nearby Metro shop (6 km from Stara Zagora railway station and 15 minutes to the connection with Trakia Motorway).
- Industrial zone "Elenino" (in development) is connected by asphalt road and located 6 km west from the city of Stara Zagora, near the village of Elenino, 2 km from the Elenino railway station and 15 km from Trakia Motorway. Water supply is available 6 km away, an electric substation is located 8 km away. The telecommunication infrastructure is in place. The plot covers an area of 21 ha municipally-owned land, the area is suitable for business development, including a logistic hub. There is an opportunity to expand the property.
- The existing industrial zones of Stara Zagora offer opportunities for increasing buildings density and active land-use in those territories, as the infrastructure and services are already in place.
- The former Stara Zagora Airport and the terrains south of the airport along Trakia Motorway have the potential to be redeveloped as a new industrial territory.
- The industrial zones in Radnevo and Galabovo are in immediate proximity to the MIEC. After some improvements, they could offer investment possibilities for the businesses that will develop on reclaimed terrains in the MIEC.
- The industrial zones in Haskovo, Dimitrovgrad, Simeonovgrad, Nova Zagora, Topolovgrad provide good options for business investments that could provide for the workers from these municipalities who are now employed in or around the MIEC. To what extent these areas will become attractive to investors is a matter of strategic decisions by local authorities. The industrial zones are accessible by road and / or rail and have infrastructure in place, although its quality should be inspected and, if necessary, improved.
- Recultivated terrains within the MIEC, as well as industrial facilities on the sites of the power plants.

Access to services (energy, water, transport)

The existing industrial zones have water and electricity supply and can be easily accessed by land, mainly by road transport. Most of the industrial zones can be reached by rail transport, which can be further improved with relatively small investments.

11 Stara Zagora Municipality Website: <https://www.starazagora.bg>

The refurbished and modern railway infrastructure in Stara Zagora region serves as the crossing point of several major rail routes. The railway station plays a key role in domestic passenger and cargo transport, as well as international cargo. The cargo module at Stara Zagora railway station acts as an intermodal hub for land transport and is equipped for transferring containers and pallets between rail and road transport.

Important roads and railways traverse or run adjacent to the region: Trakia motorway, Maritza motorway, road connections from northern Bulgaria via Shipka - Kazanlak - Stara Zagora - Haskovo - Makaza and through the Pass of the Republic - Nova Zagora - Svilengrad Sofia - Stara Zagora - Burgas, Sofia - Istanbul and Ruse - Podkova. The MIEC features a well-developed rail network, which can be used in the future economic conversion of the area. Within 150 - 400 km distance from the region are the airports of Plovdiv, Burgas, Sofia, Bucharest, Istanbul and the ports of Burgas, Ruse, Alexandroupolis, Istanbul.

IT connectivity

According to a Cisco study, Bulgaria ranks 5th in the world and the 3rd in Europe by Internet connection speed. Optical and ADSL coverage are the most popular choices of Internet access among Bulgarians. Prices vary depending on the speed and type of contract (e.g. for individual or corporate clients). It is expected that in 2018 the LoRaWAN network infrastructure will become available in Stara Zagora. LoRaWAN is a new generation communication protocol used to communicate in the world of Internet of Things (IoT). Among its many advantages are security and dual data encryption, the ability of terminals to work for up to 10 years without battery change, and the open LoRa Alliance ecosystem allowing for a variety of devices and solutions.¹²

The region is attractive for new business ventures, since it has very well developed infrastructure in the sectors of *education* (21 vocational schools, a university, a technical college, a space laboratory run by the Bulgarian Academy of Sciences, Agricultural Institute, 34 vocational training centers), *health care* (84 medical establishments in Stara Zagora Municipality), *culture* (theaters, opera, festivals etc .) and *sports* (stadiums, sports halls, including those at schools and vocational schools, swimming pools)

Lower local taxes and fees, compared to many other economic centers in Bulgaria, also contribute to the economic attractiveness of the region.

Opportunities in different economic sectors

‘Post-coal’ development of the region is envisioned in several major directions:

1. Development of new high-tech sectors
2. Development of already existing high-potential sectors and businesses
3. Specific focus on green energy and energy conservation
4. Development of existing non-energy activities owned by Maritsa Iztok Mines and the energy companies
5. Maintenance of the reserve for *force majeure* situations

Green Energy

The development of green energy in the MIEC region is favoured by local climate conditions, as well as existing investments in this sector in other parts of the region and the progress of high technology. As early as 1990s the solar power potential of the MIEC was estimated to be 11-12 thousand MW of installed capacity. With the rapid technological advances in this sector, decreasing investment costs, and the penetration of energy storage technologies and smart grids, the potential has to be reevaluated, but we expect that the MIEC area will become increasingly attractive for green energy business. However, a number of factors are required for such a development, which typically need institutional support, external financing of extrinsic costs and the development of partnerships between the public

and the private sector. From the point of view of maximum efficiency, it is clear that the current degree of airborne dust caused by the operation of MI Mines and the energy companies is an obstacle that prevents combined development with solar power. Due to that fact, a longer period of time is needed until final closure of the complex, during which all the necessary actions may be prepared, including taking the decision to create a "solar hub" in the Balkans after the end of coal power. As part of these decisions, a special organisation could be set up, involving the state, local municipalities and businesses. The purpose of that organisation would be to elaborate the future development of a photovoltaic zone. The zone includes scientific and educational entities, energy storage technologies, hubs for 'smart grids', IoT development and any related high-tech productions that arise, and could become a regional center for international cooperation.

This kind of zone also offers a chance to the municipalities of Radnevo and Galabovo, which, by adopting such a development, can turn into clean and high-tech 'cities of the future'. The creation of such a 'hub' (MIEC 2.0) will also stimulate the services sector related to its development and functioning.

Transport and Logistics

Given its strategic geographical location, current status of transport-relevant factors (infrastructure, labor, traditions), economic growth and high-technology penetration in the sector, the region can restore and indeed increase the level of transport and logistics services. Specific opportunities lie for example in creating and operating:

- intermodal terminals;
- logistics hubs;
- cargo companies;
- public urban and long-distance transport.

Development in this sector could take on skilled workers from MIEC who, after passing the required re-training courses, could be engaged in this increasingly technologically advanced sector.

One solution for MI Mines EAD, which is a licensed railway carrier, is the development of this activity through a separate organisation. The company could develop and offer services not only at local and regional, but also at national and even international level. It is important, however, for the company to obtain a license for a railway carrier not for only 5 years (as is currently the case), but for the entire period of concession of the mines.

Several local transport companies directly related to MI Mines and the power plants are also active in the region. It should be assessed whether restructuring and mergers could help those companies emerge on the national transport market in a period of declining importance of transportation to the MIEC. In case these companies manage to exit the MIEC, they definitely have the potential to take up workforce.

Information Technologies

The development of information and communication technologies and the IoT in the region is directly related to the general movement of the economy towards *Industry 4.0* on the one hand, and, on the other, to the transformation of the MIEC into a solar hub for Bulgaria and the Balkans.

Metalworking, production of (parts of) machines, transport equipment, production lines

This sector has traditions in Stara Zagora and Haskovo regions and can easily take over part of the dismissed workers, as well as companies currently serving the MIEC. The number of companies producing original equipment for the automotive industry is increasing in Stara Zagora region. This includes both domestic companies and international corporations producing automobile parts for Volkswagen, Peugeot, Renault, Fiat and others, the production being almost entirely export-oriented.

If supported by relevant investments and training, the conditions outlined above could logically give rise to companies, including local ones, that operate on the next level of transport engineering - the new clean transport vehicles. Experiments have already been run in Stara Zagora and contacts have been made with global leaders in this sector, but we have yet to see the results.

Construction

This is the type of sector that can quickly take up dismissed workers. The main challenge is for the sector to be able to meet the requirements for modern buildings fit for living, office, production and leisure.

Agriculture and livestock breeding

The agricultural sector, traditional for the Stara Zagora region, could take over part of the dismissed workers, mainly in pre-retirement and retirement age. Due to the low earnings in the sector, it can hardly be considered attractive, except as an opportunity for additional income to supplement permanent retirement benefits. The state needs to make serious efforts in order to increase the attractiveness of this sector: first, and foremost, by changing the distribution of agricultural subsidies, which are currently mainly tailored to major players in the sector, and, second, by protecting the farmers from the numerous resellers along the value chain.

Food and beverage industry

Although a traditional sector for the region, it is not expected to contribute to direct employment. Rather, its role is as a major user of agricultural production to stimulate entrepreneurship in this direction by increasing demand.

Tourism

Tourism is concentrated to the north (Sredna Gora, Rose Valley the Balkan mountain) and to the south (Eastern Rhodopes, Sakar mountain) from the region of the MIEC.

Maritsa Iztok Mines EAD owns four holiday residences located in various resorts: Stara Zagora Mineral Baths, Velingrad, Pamporovo and Glavan. When deciding how to convert businesses, MIEC or its successor may develop these assets on a market-based basis and become more active in the tourism sector.

Services

The potential of services offered locally (e.g. repairs) to develop and take on workers is similar to that of the transport sector.

Funding just transition in the region

Inasmuch as the business climate in the region is good and the macro-regional economic indicators are rather positive, it is recommended that just transition measures be financed by means of investments and, to a lesser extent, on project basis. Therefore the existing or possible business approaches (see ideas outlined above) need to be tested for their development potential in an environment with a decreasing or zero impact from coal mining and coal-fired power generation. The efforts of the relevant institutions need to be focused on providing a favorable business environment and attracting investors.

Funding the decommissioning and remediation of MIEC

Cleaning up the effects of coal mining and of the power plants' operations is one specific activity that might need to raise additional project-based funding.

The current situation is as follows:

1. There is no public information about the legal obligations of the power plants' owners as regards the elimination of negative consequences of their activities after terminating operations at the respective

facilities. This includes on the one hand the sites on which the facilities are located, the cooling lakes, the industrial waste landfills, and on the other hand, the areas contaminated as a result of their activities, other than those mentioned (most often by dust emissions and other harmful substances deposited on land). At present, power plant owners only pay fines for excess emission levels when such are established by the RIEW - Stara Zagora, but there are no fines for the damages to the agricultural and other lands in the region caused by the deposits from these emissions. There are no specially allocated funds to support the eventual closure of the facilities, unlike the two funds made available for the Kozloduy nuclear power plant.

2. Maritsa Iztok Mines EAD have the obligation to recultivate the territories developed during the period of their activity. The company seems to observe this obligation, albeit with contradictory end results. Moreover, MI Mines EAD is also obliged:

"(5.2.17.) to prepare and submit for approval by the concession provider and the competent state bodies a plan for a definitive termination (liquidation) of the site, which is the object of concession, in case of proven necessity to do so; to carry out at its own expense all the activities related to the final decommissioning (liquidation) according to the approved plan.¹³

In addition, the MIEC has the obligation to create a "final detailed exit project" for the concession territory, which determines the state to which the land must be restored when use of the site has been discontinued by the operator. Currently, no such project is publicly accessible. There are no especially targeted funds towards remediation and post-closure activities after coal mining is discontinued.

The issue of remediation of the consequences of coal mining and power generation is important with respect to the state of the sites that will be made available for future investors, depending on whether their ideas for investment would be assisted or hindered by the state of (directly or indirectly) disturbed terrains. This is true for the 240 square kilometers of mines, as well as for the power plant sites that are not negligible in size: e.g. the site of CFPP Maritsa Iztok 2 covers an area of 512 ha.

It is recommended that within the time available until 2022 (for Brikel EAD, by the end of 2019) the following activities be carried out:

1. Adoption of plans for decommissioning of mines and power plants in the Maritsa Iztok energy complex.
2. Adoption a decision of the Council of Ministers on the establishment of a Fund for the remediation of the impacts of the activities of the Maritsa Iztok Mines EAD and another Fund for remediation of the impacts of the activities of the 3 coal-fired power plants in the MIEC region (with the exception of Brikel).
3. Adoption of a decision of the Council of Ministers on the sources of financing to be used for remediation of the impacts of the operation of Brikel EAD.

Maritsa Iztok Mines' concession contract is valid for a period of 35 years, expiring in 2043. Given the existence of clear alternatives for ending coal power generation in MIEC, including for the amount of electricity to be produced until the occurrence of this end, it is of the utmost importance that the companies concerned have clarity both about the action plans and about the funding required, part of which must come from their current and future activities.

Financing investments in the region

Since the just energy transition and the economic 'substitution' of the MIEC will be the result of a combination of active business, emerging business and small start-up enterprises, all potential sources of funding must be identified. While some funds are suitable for operating companies, others for start-

¹³ Ministerial Council decision 655 of 13.07.2005 for mining concession for the Maritsa Iztok coal basin, Stara Zagora region

ups, some are for traditional sectors, others are for risky projects. In view of that, each stakeholder will have to select their suitable source of funding, while municipalities and institutions work to create a favourable and predictable investment environment.

Below is a (non-exhaustive) list of some existing sources of funding:

- traditional bank lending;
- the Bulgarian Development Bank's export credit products, on-lending, turnover-, investment- and project lending.
- European-funded operational programs continuing after 2020;
- Fund Manager of Financial Instruments in Bulgaria: capital, quasi-equity and debt financial instruments, allotted to six funds
- so-called 'venture capital' that support start-ups. Nine such funds are already operating in Bulgaria.
- Kozloduy International Fund, which has a dedicated 'window' for financing energy efficiency projects.
- Various guarantee financing programs with EU support (Juncker Plan), the Bulgarian Export Insurance Agency and Foreign Export Credit Agencies.
- Microcredit from various financial and non-financial institutions.

Financing Early Retirement Entrepreneurship

This is a specific form of entrepreneurship that can be developed by two categories of people:

- retired under Social Security Code for first and second category labour
- retired under voluntary early retirement agreements

This type of entrepreneurship is the result of the initiative of retired people of working age and is characterized by personal farms, micro- and small enterprises, cooperatives. It is based in the local economy, focusing mainly on services, agriculture, food processing and production, repair activities and, less often, manufacturing activities. This entrepreneurship model relies on personal initiative and is highly dependent on changes in the business climate.

Here the fixed (start-up) capital is expected to come from early retirement compensation. This can be supplemented with:

- loans from banks and microcredit funds;
- targeted measures under the future operational programmes, the rural regions and fisheries programmes;
- Fund Manager of Financial Instruments in Bulgaria
- Regional Initiatives.

Conclusions and recommendations

Based on research of the available information and interviews with representatives of the institutions, businesses, trade unions, municipalities and active citizens the following conclusions can be drawn:

1. A successful just transition in the MIEC region is entirely feasible, but its success depends on proper prior preparation and timely participation of national, regional and local institutions, business, trade unions and the public.
2. While the region expects leadership by "the state", history suggests that the best decisions are not always taken by "the Center". Unfortunately, the lack of regional self-government in Bulgaria is an obstacle to the just transition.
3. Pitting the just transition against the option of "keeping forever" MIEC, domestic and European coal mining is a losing strategy for Bulgaria.

4. The region has good economic and social development baseline indicators, suggesting minimal expected disturbances and long-term success in taking up the employees dismissed during the transition period.
5. The available financial sources offer a good starting point for the implementation of the just transition.
6. There is an expectation in the region that just transition should result in the creation and development of high-tech manufactures and services that bring higher incomes, and not a return to traditional sectors.
7. It is desirable for the just transition to avoid the process of over-centralization and not to focus on creating jobs only in Stara Zagora. Diversification of investments would also ease the management of municipalities, some of which need a 'kick-start' for better development, so as to keep people within their territories.