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Article

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International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Guliev, Igbal ./Geladze, Shota A. et. al. (2020). The prospects of conventional and alternative energy production in the countries of the Balkan Peninsula (in the context of developing economic indicators). In: International Journal of Energy Economics and Policy 10 (1), S. 481 - 487. https://www.econjournals.com/index.php/ijeep/article/download/8290/4814. doi:10.32479/ijeep.8290.

This Version is available at:
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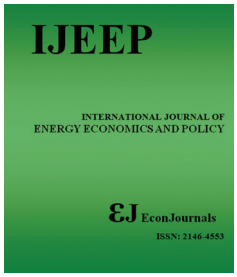

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2020, 10(1), 481-487.

The Prospects of Conventional and Alternative Energy Production in the Countries of the Balkan Peninsula (in the Context of Developing Economic Indicators)

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Received: 24 June 2019 **Accepted:** 28 September 2019 **DOI:** https://doi.org/10.32479/ijeep.8290

ABSTRACT

The article is devoted to revealing the main problems and prospects of the energy industry on the Balkan Peninsula. Due to the lack of natural resources and the low ecology standards of current energy production, reforms in the sphere are needed. There are two main approaches to these reforms that are pinpointed by the authors in the article: the development of shale resources, that is cheaper and the development of alternative energy, that is much more eco-friendly. In order to specify the path, that a Balkan country is likely to choose, the countries are divided into groups by geographical conditions and the synthesis of geographical, ecological and energy data results in a complex analysis of the energy production prospects in the region. The authors develop a special index, demonstrating the difficulty of energy production development in the region. Based on this index, the strategies to overcome the problems in the industry are offered. Special attention is payed to grouping the measures for the first and second group of countries, in which they were divided by geographical conditions. The key findings include the mentioned index, the strategies for the countries and the development of financial model of cooperation with international organizations without undermining the fragile peace in the region.

Keywords: The Balkan Peninsula, Alternative Energy, Index, Shale Resources, Strategy, Energy Independency
JEL Classifications: O13, Q41

1. INTRODUCTION

In the context of the article, the Balkan countries are the countries, forming the former Yugoslavia, Bulgaria and Albany. Some of these countries are members of the European Union, but are highly endangered by the crises, especially in the context of the energy security. The future of the energy industry on the Balkan peninsula is affected by the three main factors:

1. The natural availability of hydrocarbons and the alternative energy sources
2. The ecological standards of energy consumption and production
3. The social and political consequences of energy industry development.

The main goal of the article is to assess the future development of the energy industry in the named countries and its effect on their economies. The debt statistics of these countries are highly fragmented, but according to the data acquired from Eurostat (2019a), we can conclude, that the researched countries are highly subject to debt risks and their economies are facing numerous problems, connected with the high government and private sector liabilities. In addition to that, the countries of the Balkan peninsula receive high incomes from tourism, especially, marine

touristic activities (Vasileva and Preslavsky, 2017), that are highly vulnerable to the decline in ecologic conditions. That is the reason, we put forward the second factor.

The European Union highly supports the development of its members, but we cannot miss the fact that Germany, France and Italy have much more economic power and abilities to affect the development of lesser economies of the region, especially through foreign direct investment (FDI) in the spheres of their interest. Thus, the development of the Balkan countries is highly dependent on Italian and German investments (the region falls under the sphere of their interests). As a result, the development of the regional energy industry is based on the interests of the transnational corporations, such as ENI (Italy), Volkswind, Enercom, DEA AG (Germany) etc. Their impact is hard to assess, still the authors offer the method, included in the Balkan energy sufficiency index. The prospects of unconventional energy on the Balkan peninsula and the future of shale resources are tightly connected and form an either-or equation (either unconventional, or shale energy resources). This conclusion is made from the second and third factor, mentioned earlier.

2. LITERATURE REVIEW

The Balkan peninsula energy market is not covered in many articles, but we would like to point out the fundamental findings of these papers, that served as a base for this research. The article by Morina 2015) reveals the main features of energy security, and starts a discussion on the role of foreign actors in the region, putting forward the role of Russian exports of energy resources. This idea is continued by Mulalic and Karic (2014), but we stick to the opinion, that multinational companies in modern world are the key disseminators of government will, that was expressed in (Cuervo-Cazurra et al., 2014).

There are several articles on alternative energy use on the Balkan peninsula (Dzhonova-Atanasova et al., 2013; Bojadgieva, 2008), still we have to add, that wind and solar energy are far more spread in the region due to the climate conditions (the barriers, pointed out by the authors of the articles are unsolvable in current conditions).

In the article we have actively used the data and the findings of the paper by Vlahinić and Rosanda (2014), but we renewed the statistical data and added data on consumption and production of energy. The article by Obadi et al. (2017) served as a proof to our opinion, that the prices of oil are less significant for the economies of the countries, except for Serbia, than the growth of consumption of energy resources. In this context, the alternative energy development looks as the best option. The data for alternative energy and shale resources was gained from (Holzner and Schwarzhappel, 2018; Anthonsen et al., 2016).

3. METHODOLOGY

In order to reveal all the aspects of the researched theme, we have used the following approach. First of all, on base of the data of consumption and production of energy in the named countries and the distribution of produced energy by sources, we have proved that Balkan peninsula is an energy deficit region and depends on energy imports.

Our second point is that energy consumption from the services in service economy is higher, than from industry, and as long as the economies of several of these countries totally rely on touristic services, the volume of energy imports for all of these countries may depend on the length of the coastline and to a lesser extent from the volume of local industry. In addition to that, the researched countries are highly dependent from the FDI inflows from the most developed countries and thus are politically dependent on them. That is why, a traditional ratio of energy sufficiency is not enough. So, we have developed a special index of energy resources sufficiency, that is described hereinafter. It is a shoreline-based index, that helps to establish interconnections between energy market (economics) and natural and ecological conditions (geography, ecology). Based on this index and the assessment of the latter two factors from the introduction, we give a brief overview analysis of prospects of energy industry and give recommendations for energy production development, based on the current situation in the region.

4. RESULTS

4.1. Brief Overview of the Energy Resources of the Balkan Peninsula

The energy resources of the Balkan peninsula despite its geological potential, are scarce, the main available resource is coal, and oil in extra small quantities in separate basins. It leads to the low local generation of electric energy, on domestic resources. Still, the fast increase in the consumption of the energy, connected with the development of touristic infrastructure on the coastline puts under pressure the energy infrastructure and power generating facilities. According to the EIA (2019a), the named countries are net-importers of energy resources (Table 1). The countries are in definite need to find new energy sources, the most convenient of which seem to be unconventional energy sources or shale oil and gas resources. The shale industry is on the rise, especially in the context of American shale oil and gas, but its ecological side is murky (Salygin et al., 2019). The alternative energy sources are solar, wind and marine. Still, they need a lot of investments, that are expected to come from Germany – one of the rare countries, that succeeded in the transformation of its energy sector in eco-friendly and from Italy, that develops many projects in the sphere (Quitzow et al., 2016; Meleddu and Pulina, 2018). These two main paths of the future development of the energy industry will be discussed hereinafter.

According to EIA, the main energy-generating material in all the mentioned countries except Croatia and Albania, is coal (about 70% of all energy resources). This resource is known as a non-ecological power source, especially in the regions of its development. In addition to that, the sites of its development in Europe are old and on the verge of depletion, that makes it more expensive to maintain the overall level of production. The EU has introduced high ecological standards and its members are striving to fulfill them. From this point of view, the future of coal industry in the EU countries of the Balkan peninsula looks faint.

The situation around energy infrastructure is still weak – despite the growing investments in the area, their dynamics are still chaotic (Holzner and Schwarzhappel, 2018) and the development of eco-friendly infrastructure is postponed for a long time (Figure 1).

All in all, the situation is difficult, especially, taking into account the fact of high influence of the European multinational companies on the region (My country? Europe, 2019).

4.2. The Prospects of the Development of Energy Resources of the Region

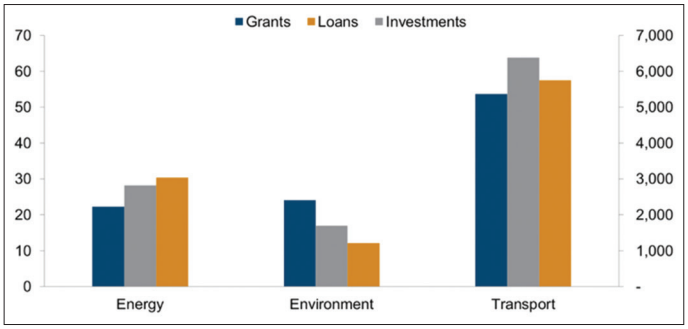
We have mentioned the current situation in the energy industry of the region, the future of the Balkan energy market is highly affected by several factors mentioned in the introduction. We have to add, that energy infrastructure of the countries needs modernization and systematization, as they are the heritage of the Yugoslavia.

There are three main scenarios of the future development of the energy sector in the named countries.

The first one is the most profitable for the Balkan countries. It is based on the supposition that alternative energy sources are effective in the named countries and that they receive enough FDI in order to construct an adequate system of energy distribution. This scenario involves the assessment of the shale resources of the Balkan peninsula. Contemporary geological researches agree on the fact that Balkan peninsula has only one potential basin – Dinarides-Lemeš basin, divided by Croatia and Bosnia and Herzegovina (Anthonsen et al., 2016). It has not been researched overwhelmingly yet, but the preliminary data allows to suppose it is quite poor. This scenario contributes to the development of the local energy industry and infrastructure and is based on alternative energy sources. Still, it will take time to come into life and requires extensive FDI inflows in the Balkan countries.

The second scenario comprises all the varieties of energy dependency of the region. The first counterparty of the Balkan countries under this scenario is Russia, that exports gas through the Black Sea pipeline (TurkStream), the second is EU, that receives the majority of its energy resources from Russia (Eurostat, 2019b) - in this case Germany will control the energy resources import to the named countries, the third is the USA with its push for shale gas exports – Italy will be the redistributor of energy resources and ENI will gain much more power in Croatia. This scenario endangers the energy independency of the Balkan peninsula and once and for always puts their economies in inferior position to the other EU countries. The future projects in this sphere and their financial aspects are covered in (Vlahinić and Rosanda, 2014), where the authors concentrate on the European Union initiatives in energy development. This approach demonstrates the high importance of the EU mechanisms of economic development, but in current conditions and taking into account the overall risky situation on the European energy market does not satisfy the most developed European countries.

Figure 1: The volume of investments of the Balkan countries (in million euro and in % of total)



Source: Created by the authors, based on (Western Balkans Investment Framework, 2019).

The third scenario is based on the rapid decline in the consumption of energy in these countries, that can be a result of the fall in the demand on touristic services, caused by the global crisis, and, as a consequence the slowdown in local economies. This scenario is possible only in the circumstances of European or global crisis, but it will affect the Balkan countries differently. It is caused by the differences in their economies and geography: in accordance with that, we divide all the researched countries in two groups (Table 2).

Table 2 allows to introduce an index that will demonstrate the energy situation on the Balkan peninsula. This index is also adjustable to any other country, that has a long shoreline and high income from the touristic activity in this sphere (for instance, Portugal, Greece, Egypt etc.) We introduce the Balkan index of energy resources sufficiency:

$$\begin{cases} I = L \times \left| \frac{\text{Energy saldo}}{\text{Consumption}} \right| + \pm \times \text{Ecology} + ^{2} \times \text{Politics if} \\ \quad L \text{ is more than 0, else:} \\ I = I \times \left| \frac{\text{Energy saldo}}{\text{Consumption}} \right| + \pm \times \text{Ecology} + ^{2} \times \text{Politics} \end{cases} \quad (1)$$

Table 1: Energy market of the Balkan countries (in Quadrillion BTU)

Country	2012	2013	2014	2015	2016
Albania					
Production	0.08	0.11	0.09	0.10	0.12
Consumption	0.11	0.13	0.12	0.12	0.12
Bosnia and Herzegovina					
Production	0.14	0.16	0.15	0.14	0.15
Consumption	0.25	0.25	0.25	0.25	0.26
Bulgaria					
Production	0.43	0.40	0.46	0.50	0.45
Consumption	0.76	0.71	0.75	0.79	0.76
Croatia					
Production	0.14	0.18	0.18	0.15	0.15
Consumption	0.36	0.36	0.35	0.34	0.35
Kosovo					
Production	0.07	0.07	0.06	0.07	0.07
Consumption	0.09	0.09	0.08	0.09	0.10
Macedonia					
Production	0.05	0.06	0.05	0.06	0.05
Consumption	0.11	0.11	0.11	0.11	0.11
Montenegro					
Production	0.03	0.04	0.03	0.03	0.03
Consumption	0.05	0.05	0.04	0.04	0.05
Serbia					
Production	0.45	0.48	0.40	0.46	0.46
Consumption	0.65	0.65	0.58	0.64	0.66
Slovenia					
Production	0.14	0.14	0.16	0.13	0.14
Consumption	0.29	0.28	0.28	0.27	0.28

Source: Compiled by the authors, based on (EIA, 2019a)

where *Ecology* and *Politics* are binominal and have values of either 0 or 1. Politics depends on the economic power of the country and equals to 0 if the country falls in the top 14 EU economies by GDP growth rates, and 1, if ranks from 15 to 28. It allows to demonstrate the political and economic influence of the most developed economies, and make a correction of index in order to represent the pressure of the developed countries multinational companies on the developing economies. Ecology index equals to 0 if the country is in the Group 2 in Table 2. It represents the difficulties of the development of energy industry and additional costs, that are caused by the "green" path of development. We do not mean, that eco-friendly development is non-beneficial to the Balkan countries, but it requires additional and massive financing. *L* is a coefficient of the length of shoreline – the Mediterranean Sea is one of the most demanded touristic locations, and most of the energy-consuming facilities are situated on the shore. In addition to that, the demand is seasonal, so it means that redistributive energy network is needed (the ideal example is the German system of legal acts, aimed at maintaining a stable demand-supply ratio in the energy system).

$$L = \frac{\text{Length of the shore}}{4058} \quad (2)$$

The 4058 km is the length of the longest shoreline on the Balkan peninsula, and the growth of consumption of energy in most of the Balkan countries is dependent on the density of touristic sites on its shoreline. For any other country, we advise to consider this value and in case of comparison analysis use the biggest length of shoreline.

I is the industry index, it equals to the industry growth of the country economy.

α and β are additional coefficients, that are adjustable to the researched region, in general conditions they are equal to the share of services and industry in the economies of the countries.

The higher the index is, the harder it is to acquire the energy market growth. The index is to be used to assess the energy industry development prospects in dynamics, but it should be used in pair with the Energy saldo data in order to gain full vision of the situation in the industry.

Table 3 shows the results of the authors' calculation of the index for the researched countries.

Serbia in our calculations got a coefficient of Politics equal to 1, as its economy growth rate lies in the range of economy growth rate below the EU 14 most dynamically developing countries. Macedonia and Croatia have a significantly higher than average value of the coefficient, it makes them the most vulnerable countries on the Balkan peninsula in the sphere of energy market and energy independence.

4.3. The Strategic Plan for the Balkan Countries

The named countries are in need of development of energy industry. In order to succeed in gaining energy independence and securing the future of their industry, they require a plan of cooperation and mutual assistance. Due to the historical conflicts between these nations, it is nearly impossible to build a firm basis of cooperation between these countries. That is why, we offer an individual plan for each country researched.

1. Croatia - The demand for energy in the country is seasonal, with high peaks at summer and lowest rates in late autumn and early spring. Taking into account the fact, that the country needs to preserve its ecology, we speak against the development of Dinarides-Lemešinarid, and we recommend to develop alternative energy. Geographical position and weather conditions allows to effectively use solar and wind energy, in some regions tide energy may be used, but with a lesser effect. In order to construct all the facilities needed, Croatia needs additional financing, but due to the high debt and slow economy growth the price of the capital will be high. The other option is to introduce additional taxes and fees for the tourist facilities, but it will make the prices even higher (Orsini and Ostojić, 2018), that may ruin the economy of the country. In order to avoid the negative consequences of both options, we offer a bundle of measures: first of all, require help from the Balkan Renewable Energy Program (UNCC, 2019), secondly, develop a shoreline lease program for the corporate sector with a special requirement of constructing alternative energy infrastructure and supporting them during the leasing time, thirdly, introduce a system of public private partnership in the sphere of energy distribution and production with the use of German model.
2. Bulgaria - The country is in a far better position, than its neighbors, still it has the same options as Croatia in the

Table 2: The Balkan countries division according to their geographical conditions

Country	Length of shoreline, km	Energy deficit, quadrillion BTU
Group 1		
Croatia	4058	0.196
Bulgaria	354	0.302
Montenegro	293	0.015
Slovenia	47	0.141
Bosnia and Herzegovina	20	0.109
Group 2		
Albania	362	0.004
Kosovo	0	0.03
Macedonia	0	0.06
Serbia	0	0.197

Source: Compiled by authors, based on (EIA, 2019b; IndexMundi, 2019)

Table 3: Balkan index of energy resources sufficiency for the researched countries

Country	Index value
Croatia	1.55
Bulgaria	0.7355
Montenegro	0.7411
Slovenia	0.6697
Bosnia and Herzegovina	0.6576
Albania	0.5669
Kosovo	-
Macedonia	1.115
Serbia	0.8534

Source: Calculated by authors, based on (IndexMundi, 2019)

sphere of alternative energy. Still, it has more time for reconstruction of its energy infrastructure because of the cheap energy sources available. The construction of TurkStream allows it to consume relatively cheap gas from Russia while reconstructing its economy. In addition to that, Bulgaria has more financial resources (Minassian, 2018), owing to which the country needs less FDI. It has an access to the cooperation with the Black Sea Trade and Development Bank, that can support the country with financial resources.

3. Montenegro - Montenegro should act with full accordance with the plan for Croatia with one additional aspect. Because of some climate differences, natural gas should be imported to the country. With respect to this point and the urge of the USA to export shale gas, it is a good idea to start constructing an import gas hub, that will be supplementary to the Italian, French and Polish ones, that provide most of the European import services for shale gas from the USA. The financial side of this offer will be easily solved through credit cooperation with the biggest American exporters of gas (Workman, 2019).
4. Slovenia - The situation on the Slovenian energy market is ambivalent. From one side, the country tends to stick to Austria and Germany in their balance between gas and alternative sources, from another it is a similar to the Croatian market. In order to gain all the benefits from this position, Slovenia has to "choose a side" – no confrontation is meant, but today it is much cheaper for Slovenia to let the situation develop as it is. In the future, when the flow of shale gas from the USA or natural gas from Russia will grow (according to the leading ecology scientists, the average yearly temperature in Europe is slightly falling due to the global warming and warmer weather in Arctic (Pasqui and Di Giuseppe, 2019; Christiansen et al., 2018), Slovenia will need to compare the costs – for now, the massive turn to the alternative energy in Slovenia looks overpriced. In addition to that, Mura-Zala basin should be researched more thoroughly and in developed in cooperation with European multinational corporations in order to cut the costs of exposing waste of shale oil and gas development.
5. Bosnia and Herzegovina - The country needs to develop its shale resources (Dinarides-Lemeš basin). But first of all, they need to be researched more thoroughly. INA has financed the research, but no further actions were taken. In addition to that, the problem of exterritorial pollution might arise, so for now, no clear plan for Bosnian shale resources can be offered.
6. Albany, Macedonia and Serbia - All of these countries rely more on industry and less on tourism. Their demand for energy is less seasonal and has a lower delta between peaks and bottoms. In this regard, it is important to find a stable energy source and benefit from energy exports (if possible). The first step is slow transformation and change – from coal energy plants to gas plants, that are far more eco-friendly. The second step is to attract FDI in their economies in general – the key industries should be supported by the state. The accent should be made on the eco-products and natural products, that can be most profitable for exports to the EU countries. The third step is to invest additional profits from exports (a fund should be created and financial resources, additionally gained from exports, that were not planned in the year budget, should be reserved on the account of this fund) in renewable energy, that is to be exported to other Balkan countries. In order to fulfil this plan, a long-run economic strategy is needed for the chosen countries.
7. Kosovo - For now, Kosovo is a self-proclaimed territory, and a disputed territory, that is not fully controlled neither by Belgrade, nor by Pristina. Any energy strategy for this territory is now impossible to develop, at least because of its status and no information on how its energy infrastructure works.

5. DISCUSSION

The offered plans for the countries are based on our vision of the future development of the economies of these countries and on their energy markets. We have considered all the possible circumstances and factors, contributing to the choice of the path of the development by the countries researched. Still, the economic crisis or other unpredictable forces may lead to the change in the situation. The main issue for the researched countries is the financial side of the question. For now, the Balkan peninsula is one of the energy dependent regions of Europe, but its position is highly vulnerable because of the low economic development rate.

The future of the region in our opinion lies in the field of developing alternative energy, especially taking into account the fact, that solar and wind energy is highly efficient in this region. In addition to that, the future of shale oil of the Balkan peninsula is difficult to estimate, because all the countries of this region highly appreciate their environment and environmental conflicts may arise on the basis of religious and national tensions in these countries. In order to prevent the proliferation of conflicts in Southern Europe a cautious approach to the development of energy markets in Balkan countries is needed. Despite the fact, that we offer that some countries of the region export energy, it may be very difficult to bring to life, because of deep and recent conflicts.

In case nothing improves in their relations, it is better to minimize the contacts of these countries in energy sphere, that means, that alternative energy sources gain even more importance in the region, and that much more FDI will be needed. The economy of the mentioned countries is quite weak, compared to the economies of South European countries (Italy, Spain, even Portugal and Greece), so the process of energy industry transformation is going to be long and painful for their economies. Still, in case no actions are taken now, the debt of these countries will be growing steadily just as its servicing costs. As a result, the growth of the economy of the Balkan countries will be falling, that threatens the EU with another debt crisis.

In addition to the mentioned options, the Balkan countries have one more path to follow, that emerged recently – it is the Chinese Belt and Road Initiative (BRI). It is commonly known, that China is seeking ways to enter the European market and pushes forward the idea of BRI in Europe. The Balkan countries, that have deep problems of both infrastructure and investment, and are not supported by the EU in the way they want it, tend to agree to the Chinese investments and become an entrance for Chinese goods on the European market. Serbia is the pioneer on this track (Banovic, 2019), the signed agreements on infrastructure

development will boost the Serbian economy. Other countries (the Group 2 countries and Bosnia) tend to follow Serbia on this track. This division again proves the idea that the longer the coastline of a Balkan country is, the more it tends to services, not industry, the more options of receiving capital resources it has and the less it needs FDI, relying on financial resources gained from national economy, especially tourism. At the same time, we cannot deny that European countries in the last few years tend to stick to the ideas of the European Union of different speeds, so the problems of the Balkan countries receive less attention. This leads to the brilliant possibilities for the Chinese capital to gain superior positions on the Balkan peninsula. Attracting credits and technical support from China is another option for the region, that will lead it to a much faster development, than it has today. That is why, the energy independence of the Balkan countries can be achieved without the EU, so relying on the Balkan devotion to the ideas of the single European zone and market is not a good idea today. When the Balkan countries get the Chinese FDI and credits, Euroscepticism will enjoy its rise in these countries, that makes the solution of the energy problem of the region by the European countries a question of utter importance for the EU. What concerns the Balkan countries, they have the chance to gain from the Chinese investments more, than lose, because PRC does not have intentions to promote its power and influence in the mentioned countries, just use them as a way to the European market.

6. CONCLUSION

The Balkan peninsula is a very controversial region with a bundle of energy problems, connected to the specific path of development. The main findings of the article can be grouped in two main spheres.

1. The Balkan index of energy resources sufficiency clearly demonstrates the difficult situation on energy market in the Balkan countries. As a result, the risks, that follow the high dependency on import energy resources are sufficient and grow with the growth of the debt of the countries researched.
2. The main direction of the energy market development in the Balkan countries is the development of alternative energy. In this context, Balkan countries are in severe need of financial resources, that can be gained by either fast development of their national economies, or by receiving financial support from international organizations. The creation of such organization for the Balkan countries and its further activity is conducted by high risk of provoking conflicts, that is why, it is important to diversify the crediting organizations and avoid providing financial support to several countries of the region by one financial organization at one time.

The shale resources of the region are scarce and hard to develop because of potential ecology harm, moreover, they are likely to be commercially unprofitable. In addition to that, the region is historically dependent on imports of energy resources and has a weak energy infrastructure, that operates on the base of old facilities and out-of-date technologies. In order to overcome that, countries with developed industry have to establish special financial mechanisms to support and boost the development of industrial sector, leading to the higher revenues and prospects of reconstructing the energy infrastructure. Still, it is worth mentioning, that only Serbia and Bulgaria have possibilities to follow this course. Other regional economies are forced to conduct the economic policies, aimed at developing services, not industry sector. The BRI is a serious threat for the EU in the region, because the Chinese power and finance will lead to the rise of Euroscepticism in the region, so providing cheap and effective solution of the Balkan energy problem becomes a very important issue for the EU.

All in all, the Balkan region has a long and difficult way to go until it achieves the energy independence and gains sufficient financial resources to develop its own energy industry.

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