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Energy (in)dependence of Bosnia and Herzegovina and strategic partnership with the Republic of Croatia - analytic view

Gordan Akrap | Dražen Barbarić | Pero Munivrana | Milan Sitarski | Stipan Zovko

Energy (in)dependence of Bosnia and Herzegovina and strategic partnership with the Republic of Croatia





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INSTITUT ZA DRUŠTVENO-POLITIČKA ISTRAŽIVANJA
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1 SUMMARY

In the period from March 2023 to the beginning of February 2024, data were collected and surveys and interviews with relevant interlocutors were conducted with the aim of making this analysis. The authors talked to employees of companies responsible for the production, transmission and distribution of energy, employees of regulatory bodies of BiH and the Republic of Croatia. The relevant data necessary for the preparation of this analysis have been collected.

The snapshot covers the following categories for the markets and companies analysed:

1. Geopolitical relations at local and regional level with a focus on energy policies
2. The energy potential of BiH.

Based on the made snapshot, the processes affecting countries and companies as well as the operations of companies related to energy policies in the observed markets were analysed. Due to the complexity of the political system and resource management in BiH, only the possibilities of establishing new companies have been analysed (in the context of building a sustainable energy policy necessary for the energy, social and economic stability of Bosnia and Herzegovina). Those companies would invest and operate an interconnection in BiH for each of the energy products (electricity and gas) for which the need for the construction of a new, or renewal of the existing supply system has been established. Although theoretically the structure of ownership and management of the new company from the economic position as well as from the position of management of the incurred infrastructure seems irrelevant, in a society such as Bosnia and Herzegovina and given the numerous challenges it faces, this issue is also of considerable importance.

Bearing in mind the geopolitical context in which BiH is located, especially the potential blackmail capital possessed by undemocratic and imperial entities in

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the field of energy, it is clear that BiH must rely on democratic states and political alliances of which it intends to become a member, in all its strategic reflections. This practically means reducing the possibility of political influence of authoritarian regimes that, thanks to the achieved state of monopoly, will exploit the underdeveloped and dispersed energy system of BiH and thus jeopardize its own long-term strategic goals, both nationally and internationally.

This specifically means that NATO and European Union member states must engage more and help BiH in further development of the energy sector and existing supply and consumer capacities. Otherwise, any passivity of NATO and the EU can produce negative results according to which BiH would remain in a permanent state of frozen conflict that would be exploited by Russia, Serbia and Turkey. This would slow BiH's Euro-Atlantic path, if not even stop it, and turn BiH into their Balkan branch which would project instability and insecurity into its neighbourhood.

A step towards energy independence of BiH would undoubtedly be helped by activities aimed at increasing energy production from renewable energy sources. This is shown by the extremely high support of citizens expressed in the public opinion survey throughout BiH. Increasing the share of renewable energy sources would not only increase domestic capacity and relieve the state of the need for imports, but in the long run it would turn BiH into a green energy exporting country.

Furthermore, a particularly important project that should contribute to the diversification and reduction of devastating geopolitical influences is the plan to build the Southern Gas Interconnection. It opens up a completely new energy perspective for BiH and minimizes Russian influence in the long run: energy, political, security, economic, social or media influence. Also, it opens the premise of further development of an industry that would use a much more acceptable and less environmentally harmful energy source. BiH can thus launch an exit strategy to abandon "dirty energy sources" and follow the EU energy policy it aspires to follow, without any difficulty.

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From a geopolitical perspective, the operator of the entire pipeline must necessarily be a public company in the co-ownership of the Federation of BiH or the counties whose territory it passes through. Also, taught by the example of the new Moldovan gas pipeline, such a project is extremely suitable for co-financing by EU institutions, as well as American and Croatian partners. The risk of handing over the construction and operational management to the existing company BH Gas, given the proven mismanagement of the current gas business, their business connection with Russian and Serbian business interests related to the activity of the existing gas pipeline, the great reputational and financial damage it caused to the state itself, and the violation of the Dayton principles really poses an unnecessary risk that puts the whole project in question. The experience of living so far in *the sui generis* political system, especially the corona virus pandemic, has proven that decentralized resources and management capacities are essential when it comes to functionality, which eliminates problems in challenging times. Therefore, the model of decentralization of the operator would enable greater functionality of the system, its quick adaptation to new conditions, reduce dependence on the influences and blackmail of the autocratic regimes of Russia, Serbia and Turkey, and increase the harmonization of the energy network and environmental standards of BiH with EU partners.

1.1 Indirect effects

Investment in a company that needs to manage energy supply would, in addition to financial ones, provide great social benefits, the usefulness of which is expressed not only through direct material values. The project would have an effect on a slight increase in employment and an increase in BiH's economic potential. The investment would also contribute to the development of tourism, and it would increase the offer and opportunities offered to all visitors.

Social benefits can be briefly defined as:

- increase in employment,

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- positive impact on the tourism sector,
- increase in added value in local self-government units (LGU),
- increase in taxes and contributions,
- increase in security of energy supply,
- reduction of CO₂/GHG emissions,

1.2 Quantification of social benefits

In addition to real income, it is also necessary to list other effects essential for the assessment of the economic advantages for society. This group of advantages include cultural, material and other benefits, that are more difficult to measure. However, it is necessary to assess these advantages in monetary terms, to assess the socio-economic benefits of the investment. If an investment does not have positive economic results from a social perspective, it is unjustified.

Generally, the society and the state in which such investments take place sees the following benefits:

- Increase in security of energy supply,
- Benefits of taxes and contributions on wages,
- Creating new jobs in crafts/companies in businesses that will benefit from the quality and availability of energy products,
- Creating added value through the number of new employees,
- Additional economic activity in counties/cantons through which a new/renewed energy supply route passes (West Herzegovina, Herzegovina-Neretva, Central Bosnia, City of Sarajevo),
- Access to better quality and cheaper energy for citizens,
- Positive impact on the tourism sector,
- Reducing health problems related to air pollution,
- Savings on energy costs used in households and industry.

These are all applicable to Bosnia and Herzegovina.

2 INTRODUCTION

Bosnia and Herzegovina (BiH) was formed during the process of the bloody disintegration of the SFRY caused by the aggression of Yugoslavia and Serbia. BiH is based on the Washington, Dayton and Paris Peace Agreements, has two entities (and Brčko District), according to the Constitution has three constituent and equal peoples, has been and still is burdened by numerous internal conflicts, challenges, prejudices and problems. In an analysis written in May 2019.¹, we have clearly stated our position on the area covered by the name WB6 (Albania, Bosnia and Herzegovina, Montenegro, Kosovo, North Macedonia, Serbia) as well as on BiH itself:

Painful experiences with totalitarian and authoritarian regimes, and the constant delay in solving certain national issues in multiethnic communities, have slowed down or completely stopped the democratic consolidation of societies and states. This complex reform venture will pose a major challenge to political elites throughout the Western Balkans in the next decade. (...) Because of all this, it can be said that the countries of the Western Balkans are an example of underdeveloped democracies, devastated and divided societies, weak economies, oases of organized crime, which is why they represent an easy target for Russia, China and Turkey, who, ever so aggressively want to expand their influence in this area, and that is clearly shown by the political and economic processes in the past year. (...)

After the signing of the Dayton Peace Agreements, which stopped the war and imposed peace in Bosnia and Herzegovina at the end of 1995, the country is still far from political, social, national, ethnic and economic stability. Bosnia and Herzegovina's plural society does not share a common vision of political unity, which

¹ Institute for Hybrid Conflict Research: Analysis - European Union and the Western Balkans: Opportunities, Challenges, Solutions; 14 May 2019, <https://zagrebsecurityforum.com/analysis/id/1077>, Access: 2/2/2024

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makes it impossible to establish a political community. The problems of legitimacy are hampered by the process of globalization as well as constitutional solutions created with the auspices of the international community. Political elites fail to reach agreement on any significant issue, while nationalist, national, civic and "civic" views are constantly clashing on the intellectual scene.

An issue that is at stake more than ever before, after the recent parliamentary and presidential elections - is it possible to establish a political community in BiH on the basis of the Dayton Constitutional Solution? If not, what reforms need to be implemented to bring BiH closer to that goal? The constitution of a political community that will base its legitimacy on the support of all three constituent peoples and all citizens is the most significant prerequisite for stabilizing the democratic political order.

Later developments showed that our, then stated attitudes remain valid. Only partial changes to the electoral law (attempting to gradually return to the basic provisions of the Dayton Peace Agreements regarding electoral processes) imposed by the High Representative on election night 2022 created the conditions to begin of the process of political consolidation of the state, to establish a policy of cooperation of political parties that are legitimate representatives of constituent peoples in BiH.

The WB6 area still remains an area of unconsolidated democracy, burdened by numerous internal conflicts that originate in internal, inter-national and regional issues that have plagued societies and states for many years. In such conditions, these states represent a suitable area for malicious activities of various political actors who further aggravate these difficult situations with their information, energy, political, economic, security, diplomatic and intelligence policies and related actions.

In the light of the second Russian aggression against Ukraine (February 2022), as well as in the analysis of Russian energy strategies and policies as a form of

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malicious actions towards different countries and territories they have made (mostly temporary, while some are still dependent) energy dependent, we observe Bosnia and Herzegovina and its current energy potentials, opportunities and needs in accordance with existing and planned energy supply routes.

Given that there are certain doubts about the possible solutions of energy connection of BiH with neighbouring countries (i.e. on the one hand the EU and the Russian Federation on the other, as well as models of managing new energy connections), we will also describe the case of Moldova's energy dependence on Russia, the role of the temporarily occupied territory of Moldova, which is under the supervision of the Russian Armed Forces, and the role of energy strategies and policies of Russia and the EU/NATO alliance in the (de)stabilization of this area. We believe that there are a large number of similarities that can serve as a landmark for proposals for possible sustainable solutions for BiH with the aim of achieving energy stability.

In this document, we did not put emphasis on the financial side of the realization of individual projects within the framework of the Southern Interconnection. As recent history has shown, construction of such systems, which represent the key critical infrastructure of a country (according to the NIS2 directive²) cannot be a quick cost-effective project from the financial aspect. However, such projects become financially viable when viewed from other perspectives, in accordance with their secondary and tertiary effects. To put things in perspective, relying on only one supply route (or several energy supply routes coming from the same source) in times of crisis, which was evident after the second Russian aggression against Ukraine, leads either to a loss of access to energy sources or to a rapid and intensive increase in their price. Therefore, the number of supply routes from different sources is necessary for energy, political, social, economic and security stability and the persistence of the endangered state and society.

Our interlocutors, eminent representatives of the profession in various energy fields, emphasize the necessity of a comprehensive look at the cost-

² NIS-2 Directive, EU, <https://www.nis-2-directive.com/>, access 2.2.2024.

effectiveness of the project such as the Southern Interconnection, which should not be viewed solely and exclusively through immediate financial viability. We looked at the Southern Interconnection and the strategic connection of Bosnia and Herzegovina with the Republic of Croatia, and thus with the EU in that context.

2.1 Identification and analysis of options

During the creation of this analysis, we were guided by the following options that describe the necessary / estimated activities necessary for achieving the state of energy independence of Bosnia and Herzegovina and its possible strategic connection with the Republic of Croatia and Europe:

- a. Business As Usual (BAU) - the scenario of the current situation, there is no construction of additional capacity for the transmission of electricity and gas.
- b. Do Minimum - Minimum works (preservation of the current level of connection of BiH with Croatia) that imply the maintenance and gradual expansion of the existing electrical power transmission system, while the pipeline is not built.
- c. Do something else – BiH's electrical power system focuses on its own sources; The gas system is being expanded by the construction of an additional gas pipeline to Serbia, which would continue the further distribution of Russian gas.
- d. Scenario Project – construction of additional capacities and significant renovation of the existing system with the aim of significantly increasing the transmission capacity of electricity and gas by connecting BiH to Croatia, i.e. Europe by the so-called Southern Interconnection.

a) BAU – no changes

The scenario of the current situation shows us an option that would not change the current state of the project investment. In this case, there is no realisation of interconnection project. This option does not provide additional capacity for the import/export of electricity and does not allow the import of gas from the supply route that does not depend on Russia, Turkey and Serbia.

With the current state of energy needs, the population of BiH and industry would be deprived of possible cheaper energy sources and security of supply would be at a much lower level. The current state of the electricity and gas pipeline system does not allow for the transition towards a low-carbon economy that has begun to take place in the EU and to which BiH will have to adapt in the foreseeable future.

b) Do Minimum

The "Do minimum" option includes maintenance of the power system and possible reduction of losses in the transmission and distribution system. The construction of the Southern Interconnection would not be realized.

In this option, the project task would be to maintain the current state of the electricity and gas systems in BiH. The cost of this option would be low. However, given the complexity of the current state of the BiH power system, it is not negligible. A build of new capital facility, other than maintaining existing ones and reducing losses, would not occur. BiH would remain dependent (in the context of gas supplies) of Russia.

c) Do something else

BiH's power system would focus on the rapid construction of local sources of electricity from renewable sources that would be sufficient to meet its own needs. This option is in line with the modern concept of energy and smart transmission networks. In this scenario, it would be necessary to carry out a complete renovation of the existing electricity network and the construction of numerous energy facilities. However, further analysis would likely confirm

the assumption that the existing electricity transmission infrastructure cannot be restored quickly and cost-effectively. Building new energy sources requires time necessary for construction as well as enhancing the capacity to receive electricity from new sources. The cost-effectiveness of this option is questionable, and it would probably not solve the electricity independence of BiH completely (e.g. seasonality of wind power plants (WPP) and solar power plants (SPP) is a big problem).

The construction of an additional pipeline to Serbia would enable an increase in the capacity of gas transmission that would be available to consumers in BiH. The cost of building this pipeline is comparable to the cost of building the Southern Interconnection (comparable distances and terrain configuration and access to the distribution network that already exists). The biggest disadvantage of this option is the fact that BiH would gain access to gas that comes from the same sources that can become questionable in certain geopolitical situations. Due to everything mentioned, this option, construction of a transmission pipeline also does not seem likely or strategically acceptable (although Gazprom offered to pay the cost of the entire project – which poses a significant political and security risk for BiH).

d) Scenario Project – Construction of new capacities for the transmission of electricity and gas through the Southern Interconnection

By choosing this option, which is the subject of this analysis, all activities necessary for the realization of the construction of new and important renovation of existing power lines and gas pipelines would be carried out in order to ensure additional transmission capacities and security of energy supply. This option possesses qualities that other commented options lack. The construction of the supply route by connecting to the networks that exist in Croatia would result in greater availability of energy, security of supply and perhaps slightly lower energy prices.

Unlike the previously mentioned options, the realisation of this project provides the possibility of revenues from the energy transmission service.

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Furthermore, a need for employment and training of new experts would occur, which is not the case with previous options.

The scenario Project has the most advantages – building new energy transmission capacities. Due to all the advantages listed, this option was chosen for further analysis.

Table 1 Analysed scenarios

Option	Advantages	Disadvantages
Business as Usual Scenario (BAU) - i.e. no construction of network connections to Croatia	<ul style="list-style-type: none"> - no investment costs, - only maintenance costs. 	<ul style="list-style-type: none"> -economic growth and sustainable development remain unchanged - no new employment -the problem of energy export/import is not solved - energy dependence of BiH is not reduced
Do Minimum Scenario –maintaining the existing state	<ul style="list-style-type: none"> - facilities are maintained and additional losses in the system are prevented -plausible small investment in reducing losses. -lower investment costs 	<ul style="list-style-type: none"> - no new energy transmission capacities (no new own energy production) - no new energy consumers. -BiH is equally dependent on energy transmission through existing capacities and one supply form (gas)
Do something else Scenario – building own electricity sources and a new gas pipeline to Serbia	<ul style="list-style-type: none"> - the required amounts of energy would be gradually provided 	<ul style="list-style-type: none"> - questionable economic viability - questionable deadline for the realization of projects -no new customers in the south BiH -BiH's dependence on gas supplies from Serbia still remains - higher cost of investments compared to the previous two options
Scenario Project – Building new energy transmission capacity through Southern Interconnection	<ul style="list-style-type: none"> - secured capacities for import/export of electricity -no dependence on the supply of Russian gas from Serbia -potentially lower energy prices - employment in two new companies - an investment that the EU would finance at least partially -economic self-sustainability of both companies 	<ul style="list-style-type: none"> -higher initial costs

2.1.1 General technical indicators of business

In order to compare the operations of energy production and distribution companies before and after the project, it is necessary to define some general technical indicators.

2.1.1.1 Share of losses in total amount of electricity

This is a commonly used indicator when it comes to electricity transmission. It is regularly used to display losses in the system, since it is the easiest to calculate, but from a technical aspect it is unsuitable for assessing the efficiency of the management of the electricity distribution system. The disadvantage of this indicator (especially if viewed in isolation from all other indicators) is that it in no way considers the technical characteristics of the system that can affect the creation of losses on some part or throughout the whole system.

In general, losses in the power system can be divided into two groups, according to the type:

- Technical losses,
- Non-technical losses.

Technical losses can additionally be divided into variable and fixed losses. Variable losses occur due to heating of lines, cables and copper of the transformers when transferring large amounts of energy. These losses depend on the degree of usage of the power system and are proportional to the square of the current in the conductor. Fixed or constant losses represent losses caused by the maintenance of lines and transformers in operation, and mainly depend on the number of components in operation.

Non-technical losses represent the difference between total and technical losses, i.e. the part of electricity that has been consumed, but for a certain reason not recorded by the measuring device (for example, theft, malfunction

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of the measuring device, etc.). It is believed that the loss amount for technical losses can be up to 12%. In the event that the loss amount exceeds this number, it can be assumed that the non-technical part of the losses has increased. Furthermore, losses are largely dependent on the voltage level. At higher voltage levels, due to the decrease in the amount of electricity, the loss amount is decreased, and the losses of the transmission system are lower in comparison to the distribution system. In some European countries, due to the state and age of power equipment and system configuration, distribution system losses can be significantly higher than losses of the transmission system.

*Table 2 Electricity infrastructure losses index - an indicator of the quality of
loss control in the system*

Percentage of losses	Loss control	Recommendation
<2%	Very good	This is a loss management that is considered very successful everywhere in the world. The company needs to maintain this level of loss management.
2-4%	Good	Investments in further loss reduction must be thoroughly financially analysed.
4-6%	Unsatisfactory	It is necessary to control the pressure and leakage in the system. Better maintenance and management of the system is needed.
6-8%	Weak	It is necessary to analyse why and where losses occur in the system. Measures must be implemented to reduce established losses. Such a high amount indicates the necessity of investing in system maintenance and employee education.
>8%	Worrying losses	Significant losses in the system that cannot be tolerated. It is necessary to draw up a plan to reduce losses in the system and invest in the implementation of the envisaged measures.

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According to HERA (Croatian Energy Regulatory Agency), losses in the transmission system in Croatia fluctuate between 1.9 and 2.2%. In BiH, losses in the transmission system are 1.83%.³

In Croatia, losses in the distribution network are between 8 and 9.3%. In BiH, losses in the distribution network are at 8,83%.⁴

³ State Electricity Regulatory Commission, Activity Report – 2022, p. 2. Available at: <https://www.derk.ba/DocumentsPDFs/DERK-Izvjestaj-o-radu-2022-h.pdf>, accessed: 2/3/2024.

⁴ Ibid

3 BOSNIA AND HERZEGOVINA

3.1 Basic data and assessments of economic development

Bosnia and Herzegovina has about 3,555 million inhabitants (according to the 2022 census), occupies an area of 51,222.84 km², 51,089 km² of which is land and 30.67 km² is sea. BiH possesses a range of natural resources. 53% Of the total territory of BiH is covered by agricultural land, 37% by forests, and 0.6% by wetlands. BiH has a 21.2km long coastline that accounts for 1.3% of the country's border.

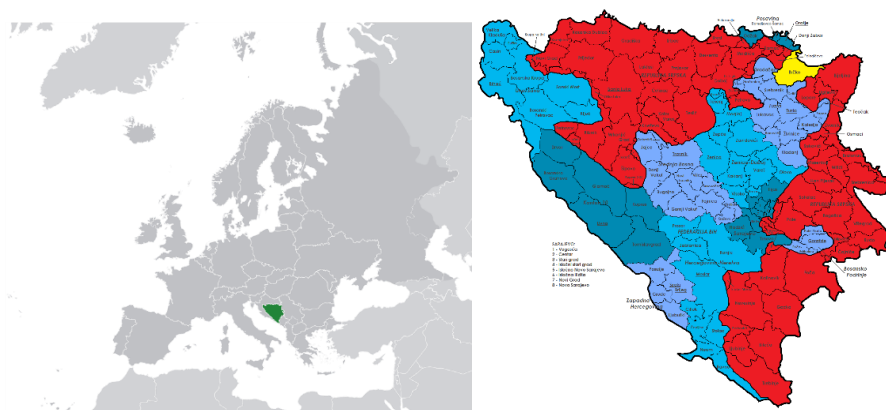


Figure 1 BiH within Europe and the political map of BiH⁵

⁵ www.worldofmaps.net

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According to data of Statista.eu, BiH can expect an increase in the amount of GDP per capita by 2028, as a consequence of significant growth in total GDP, as well as a decrease in inflation to low levels.

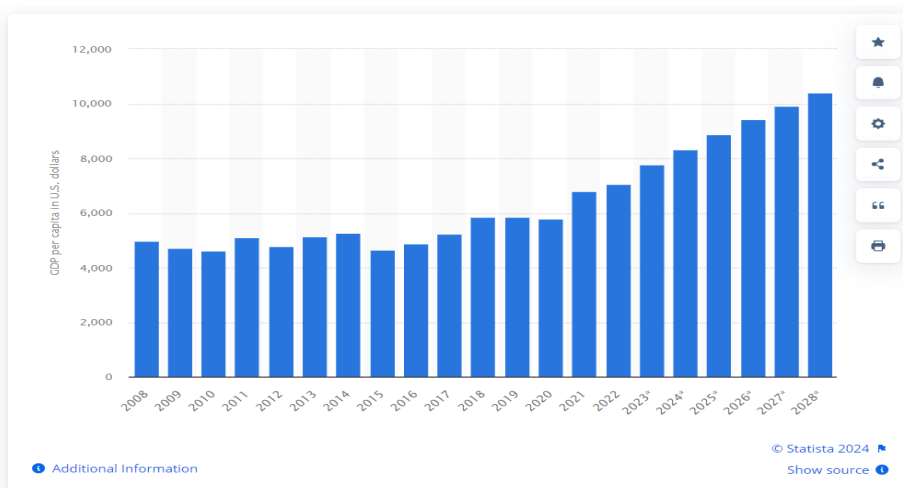


Figure 2 Estimate of GDP per capita growth by 2028⁶

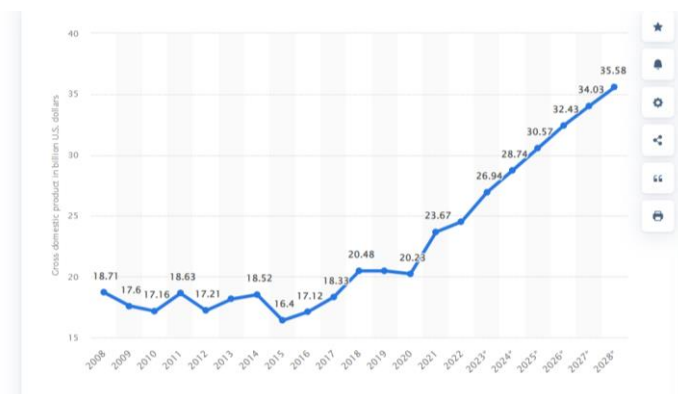


Figure 3 Estimate of GDP growth by 2028⁷

⁶ Bosnia & Herzegovina - gross domestic product (GDP) per capita 2008-2028 | Statista

⁷ Bosnia & Herzegovina - gross domestic product (GDP) 2008-2028 | Statista

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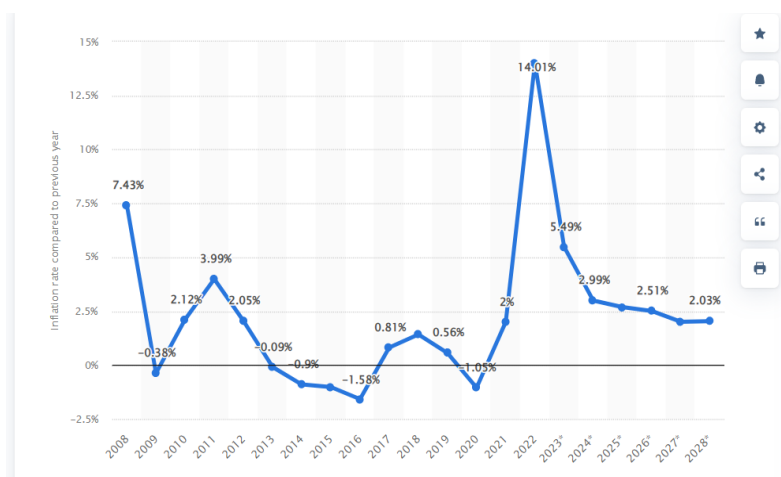


Figure 4 Estimate of inflation developments by 2028⁸

⁸ Bosnia & Herzegovina- inflation rate 2008-2028 | Statista

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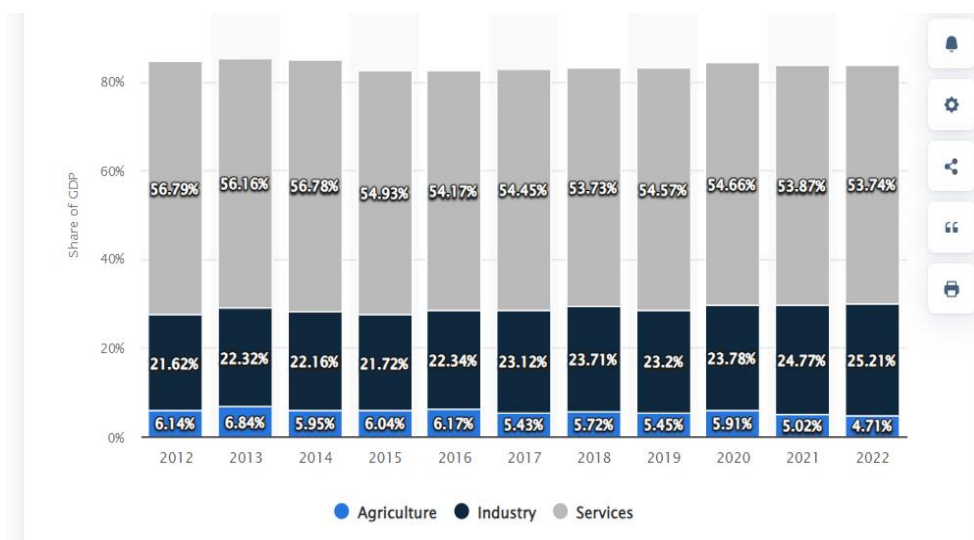


Figure 5 GDP distribution across economic sectors 2012-2022⁹

⁹ Bosnia & Herzegovina - GDP distribution across economic sectors 2012-2022 | Statista

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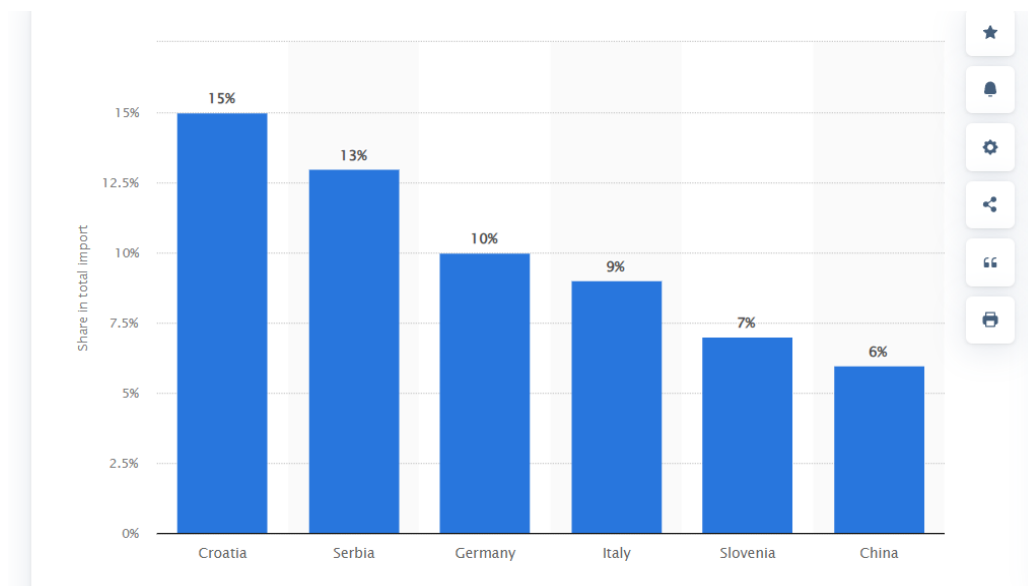


Figure 6 Overview of the main import partners of BiH¹⁰

¹⁰ Bosnia & Herzegovina - main import partners 2019 | Statista

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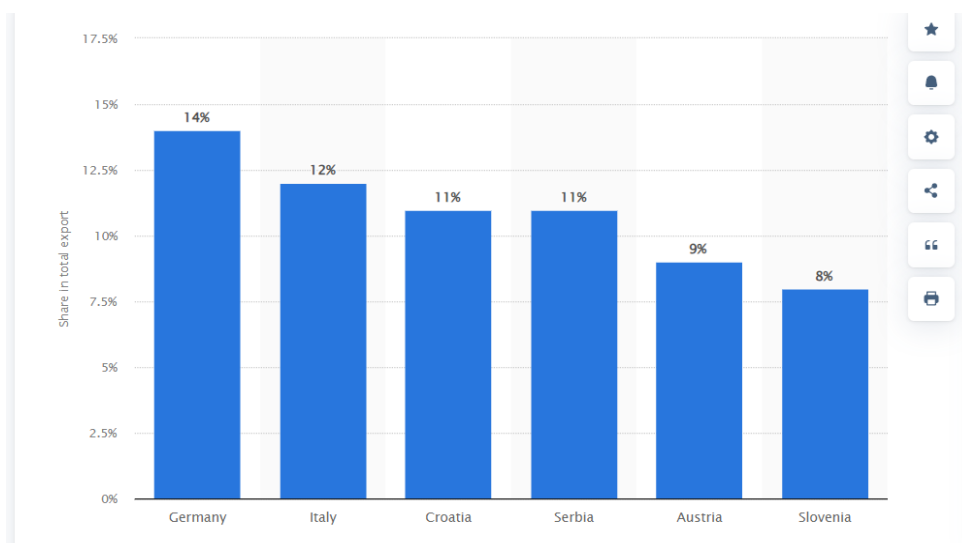


Figure 7 Overview of the main export partners of BiH ¹¹

¹¹ Bosnia & Herzegovina - main export partners in 2019 | Statista

3.2 Economic indicators of the Federation of Bosnia and Herzegovina

Based on the collected statistical data, it can be concluded that the developments of economic activities in the Federation of Bosnia and Herzegovina (FBiH) in 2021 had a slight growth trend, that the average employment reached the level of 525,397 people, which indicates that employment is returning to the growth trend as before the onset of the Covid-19 pandemic. The employment rate and average wage also rose slightly while registered unemployment continued a slight downward trend. Pensions remained unchanged despite a 0.3% increase in the number of pensioners related to the year before. The economy of BiH and the FBiH, as well as other world economies, experienced several shocks since 2020, primarily the permanent effects of the pandemic that were reflected in supply chains, then the rise in food prices, which led to the fact that in December 2021 compared to December 2020, prices increased by 6.5% (annual inflation).

Table 3 Development of cantons in the Federation of BiH

Kantoni	Rang	Rast / pad*	Grupa	Indeks 2021	Prihod od poreza na dohodak po 2021	Stepen zaposlenosti 2021	Kretanje stanovništva 2013-2021	Učešće starog stanovništva 2021	Stepen obrazovanja radne snage 2021
Kanton Sarajevo	1	0	I	2,02	2,98	2,33	1,81	0,84	1,62
Zapadnohercegovački	2	0	II	1,06	0,82	0,83	0,99	0,85	1,84
Bosansko-podrinjski	3	1	II	1,04	1,42	1,85	0,27	0,28	1,09
Hercegovačko-neretvanski	4	-1	II	0,99	1,07	1,11	0,77	0,57	1,31
Zeničko-dobojski	5	1	II	0,84	0,58	0,92	0,89	1,25	0,71
Tuzlanski	6	-1	II	0,84	0,64	0,90	0,98	1,00	0,75
Srednjobosanski	7	0	II	0,65	0,21	0,59	0,85	1,27	0,58
Unsko-sanski	8	0	III	0,41	0,14	0,00	0,78	1,46	0,00
Posavski	9	0	III	0,29	0,13	0,11	0,00	0,69	0,68
Kanton 10	10	0	III	0,27	0,00	0,05	0,09	0,00	1,24

Izračun i obrada: Federalni zavod za programiranje razvoja

According to the calculation of the FZZPR development index in 2021 (Table 3), Sarajevo Canton is still in the 1st place in terms of development ranking, while Canton 10 (Hercegbosna Canton) is in the last 10th place.

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Table 4 Basic economic indicators of the Federation of BiH 2017-2021¹²

	2017	2018	2019	2020	2021
Stanovništvo u hilj. (proc. sredinom godine)	2.201	2.196	2.190	2.185	2.169
Radno sposobno stanovništvo (15-64)	1.550.130	1.538.814	1.526.894	1.513.497	1.499.495
Radna snaga - prosjek	863.172	855.410	845.053	841.762	837.076
Zaposlenost - prosjek	505.201 ²	519.800	531.483	520.162	525.397
Stopa zaposlenosti u % ¹	32,6	33,8	34,8	34,4	35,0
Stopa aktivnosti u % ²	55,7	55,6	55,3	55,6	55,8
Nezaposlenost – prosjek	357.971	335.610	313.570	321.581	311.679
Stopa nezaposlenosti u % ³	41,5	39,2	37,1	38,2	37,2
Bruto domaći proizvod u 000 KM	20.539.696	21.983.507	23.179.128	22.255.014	25.026.051 ⁴
Indeks potrošačkih cijena – CPI	101,7	101,6	100,6	99,1	102,1
Porezi na dohotke fizičkih lica u mil. KM ⁵	380,3	398,1	427,9	452,0	530,3
Porezi na dohotke fizičkih lica po stan. u KM	173,0	181,3	195,4	206,9	245
Neto plaća - prosječna u KM	860	889	928	956	996
Industrijska proizvodnja - indeks	103,8	100,8	97,3	94,2	109,8
Izvoz robe - u 000 KM	7.254.540	7.911.910	7.620.114	6.871.411	9.571.099
Uvoz robe - u 000 KM	12.435.049	13.266.591	13.844.811	11.680.596	15.131.784
Trgovinski bilans u 000 KM (deficit)	-5.180.508	-5.354.681	-6.224.697	-4.809.186	-5.560.686
Pokrivenosti uvoza izvozom u %	58,3	59,6	55,0	58,8	63,3
Penzija - prosječna u KM	372	399	416	428	428
Broj penzionera – stanje 31.12.	412.539	416.828	424.009	428.117	429.545
Broj poslovnih subjekata – stanje 31.12.	105.961	110.536	112.955	114.867	117.160
Bruto ostvarene investicije u mil. KM ⁶	3.292	3.398	3.649	3.419	-
Stopa investiranja ⁷	16,0	15,5	15,7	15,4	-

According to the data that is visible in the above figures and tables, several conclusions can be drawn:

1. There is an optimism in the expectations of economic growth and development of Bosnia and Herzegovina and improvement of the standard of living of the population in Bosnia and Herzegovina, which should create preconditions that should lead to political stabilization of both the state and society.
2. Bosnia and Herzegovina is in economic terms naturally and intensively oriented towards the West, i.e. towards the Republic of Croatia and the Member States of the EU and NATO alliance.
3. The Federation of BiH is not evenly developed. However, there is good development potential in the southern counties/cantons of BiH that

¹² Federal Bureau of Statistics , 2021, processed: Federal Bureau for development programming

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lean on a more populated and energetically and economically potent part of the Republic of Croatia, which is a fact that should be further used with the aim of strategic allyng the two countries.

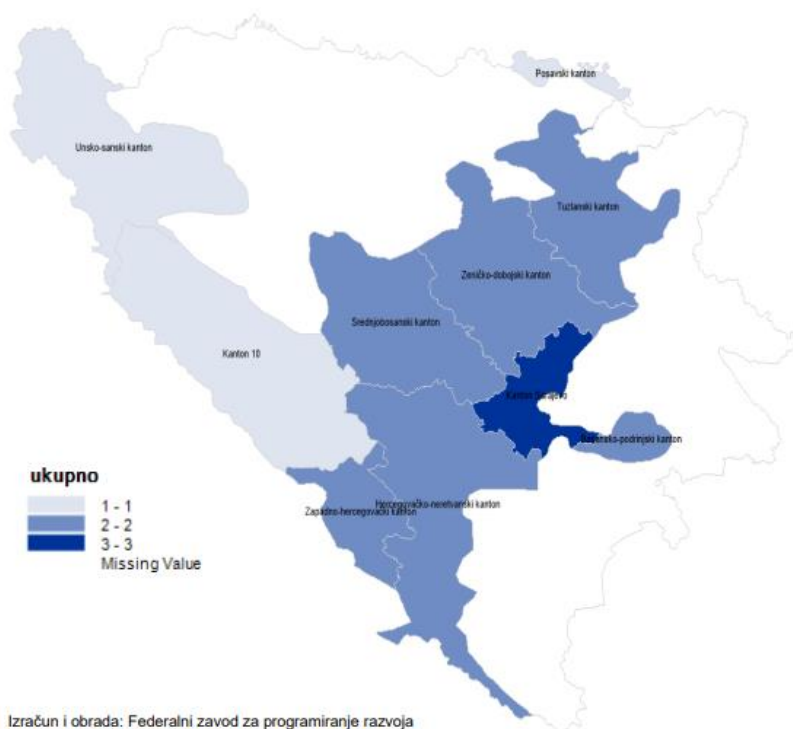


Figure 8 Development indicator of cantons in the Federation of BiH

3.3 Climate¹³

BiH is located in an area that is a combination of continental and mountain climate (due to altitude). The average climatic conditions are shown in the following figures:

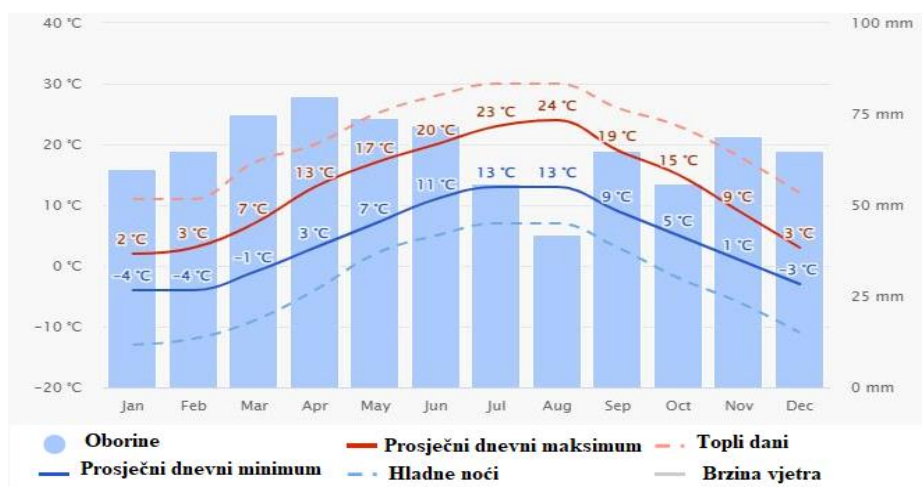


Figure 9 Average temperatures and precipitation

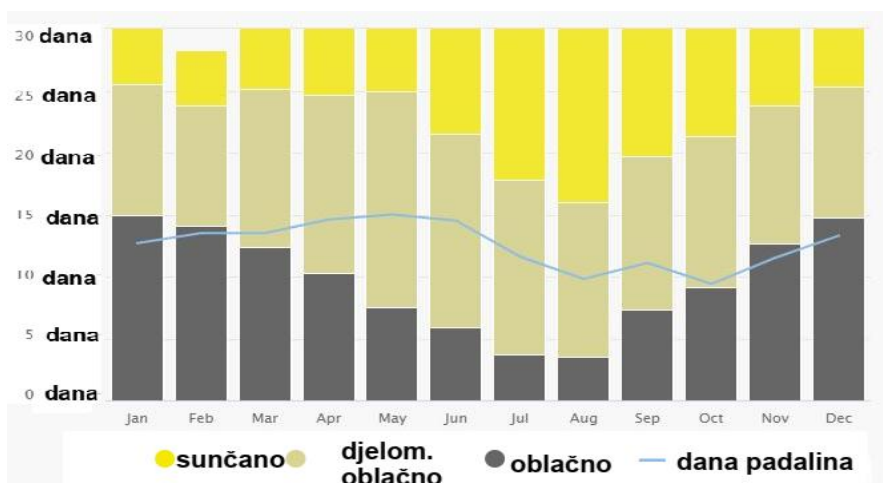


Figure 10 Cloudy, sunny and rainy days during the year

¹³ https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/bosnia-and-herzegovina_bosnia-and-herzegovina_3277605

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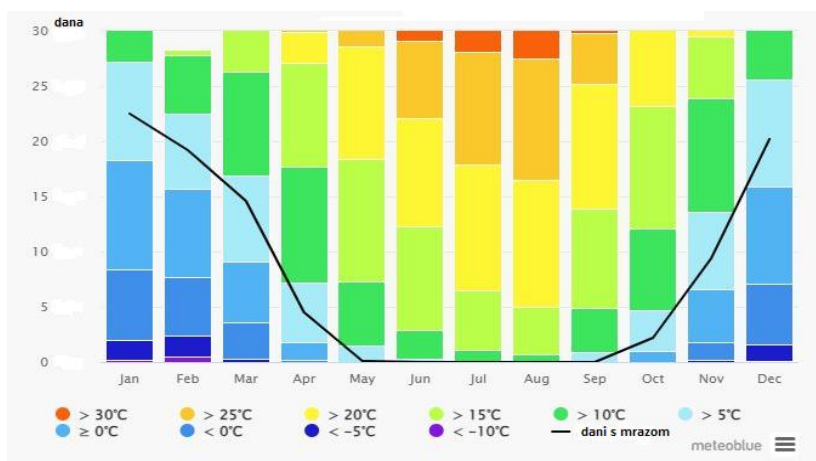


Figure 11 Maximum temperatures

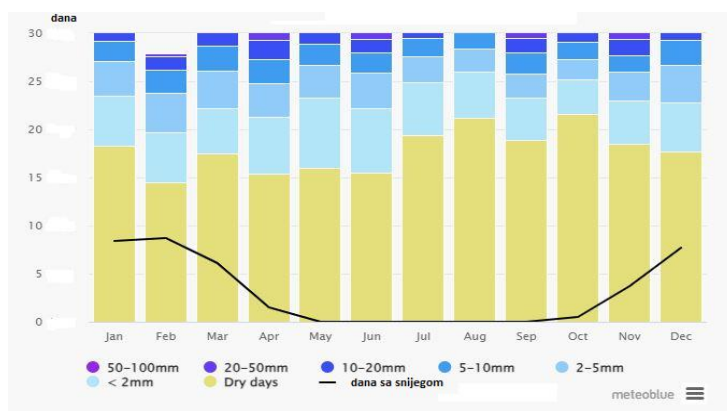


Figure 12 Precipitation

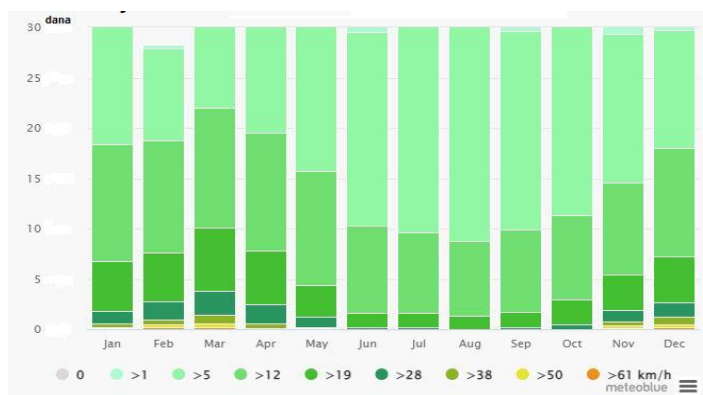


Figure 13 Wind speed

4 MAPPING OF ENERGY INFRASTRUCTURE BETWEEN BIH AND NEIGHBOURING COUNTRIES

4.1 *BiH electricity system and connections with neighbouring countries*

The BiH power system was developed during the existence of SFRY. Therefore, connections with the power systems of neighbouring, then republics, and today states, date back to that time. Part of the transmission and distribution network was damaged during the war and is in the process of reconstruction. Elektroprijenos BiH in the document "Long-term plan for the development of the transmission network 2021-2030¹⁴" describes the planned reconstruction of the damaged network and the increase of its capacities.

According to the current methodology of calculation of transmission capacities, the maximum calculated transmission capacities at the borders of BiH, in both directions, are:

- BA-HR 1000 MW
- BA-ME 500 MW
- BA-RS 600 MW¹⁵

According to these data, it is clearly visible that Elektroprivreda BiH has the largest capacity for electricity transmission to Croatia.

Figure 14 (2022 situation) shows the power system of BiH with division into operational areas and existing power connections with neighbouring countries. Careful analysis of the spatial plans of all counties in Croatia and the peripheral areas of Serbia and Montenegro has detected the existing and planned cross-border electricity connections (transmission landlines and underground lines). The indication of planned lines/transmission lines is considered an indication that the facility will be realized in 10 years.

¹⁴ <https://www.nosbih.ba/files/2021/03/20210311-lat-Dugorocni-plan-razvoja-prenosne-mreze-2021-2030-Knjiga-1.pdf>,

¹⁵ The capacity utilisation of the transmission system between BiH and Serbia and BiH and Montenegro could not be obtained.

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Table 5 lists all existing as well as planned transmission landlines between BiH and neighbouring countries.

Table 6 shows data relating to the total capacity and utilization of lines between Croatia and Bosnia and Herzegovina. The table also shows the capacity utilization of transmission lines between BiH and Croatia.

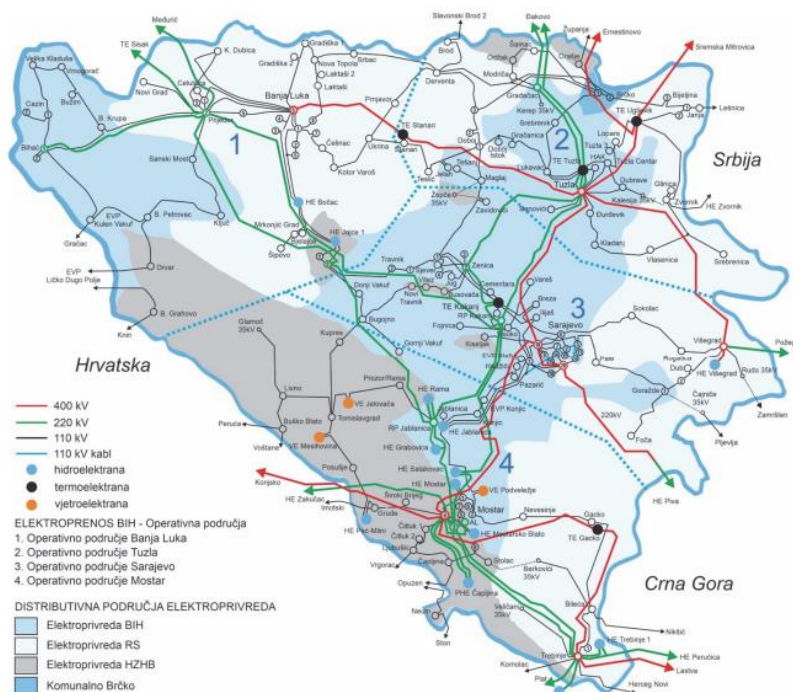


Figure 14 EES BiH map for 2022¹⁶

¹⁶ State Electricity Regulatory Commission, Activity Report – 2022, p. 91. available at: <https://www.derk.ba/DocumentsPDFs/DERK-lzvjestaj-o-radu-2022-h.pdf>, accessed: 2/3/2024.

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Croatia	Total	Serbia	Total	Montenegro	Total
Transmission line	27	Transmission line	13	Transmission line	5
35kV	2	35kV	2	35kV	0
110kV	13	110kV	4	110kV	2
220kV	10	220kV	6	220kV	2
400kV	2	400kV	1	400kV	1
Transmission line (planned)	14	Transmission line (planned)	3	Transmission line (planned)	1
110kV	3	110kV	2	110kV	0
400kV	11	400kV	1	400kV	1

Table 5 Cross-border electricity systems towards BiH

From tables 5 and 6 it is clear that the most utilized transmission lines are those between Trebinje and Komolac (110kV) and Mostar and Zakučac (220kV). The transmission capacity utilization of the Nikola Tesla ring (400kV) is nowhere near its transmission capabilities. When studying the data from the table above without considering the dynamic conditions in transmission networks, it is clear that there are occasional excesses of capacity between BiH and Croatia. But the state of transmission networks is very dynamic. Situations when there are transmission capacity shortages exist and happen. They are very common ("expected conditions") in situations where hydrological conditions are favourable, i.e. when the water supply is increased. Given the close connection between the systems of Croatia and Bosnia and Herzegovina in Dalmatia and Herzegovina, situations of favourable hydrological conditions appear at the same time. Therefore, according to

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experts from HOPS, an inability to transfer all available energy through existing transmission systems occurs.

Table 6 Total capacity and utilization of lines Croatia - Bosnia and Herzegovina

Naponska razina	Ime dalekovoda	SN	2020			2021			2022					
			BH → HRV	HRV → BH	BH → HRV	HRV → BH	BH → HRV	HRV → BH	BH → HRV	HRV → BH	BH → HRV	HRV → BH		
110	DV 110 kV BOS. GRAHOVO - EIP STRMIČA - KVIN	84	24,7	45,0	29%	54%	21,1	42,7	25%	51%	26,3	57,6	31%	69%
	DV 110 kV BUŠKO BLATO - LIVNO	115	63,1	55,4	55%	48%	65,2	62,0	57%	54%	42,2	46,2	37%	40%
	DV 110 kV ČAPLJINA - OPUZEN	90	17,5	25,0	19%	28%	36,6	23,9	41%	27%	23,6	24,4	26%	27%
	DV 110 kV GRAČAC - KULEN VAKUF	123	52,6	63,4	43%	52%	50,2	47,5	41%	39%	60,7	50,3	49%	41%
	DV 110 kV GRUDE - IMOTSKI	72	40,2	50,9	56%	71%	59,4	38,7	83%	54%	56,6	36,0	79%	50%
	DV 110 kV LJUBUŠKI - VRGORAC	84	32,0	22,1	38%	26%	37,6	19,8	45%	24%	61,3	19,0	73%	23%
	DV 110 kV NEUM - STON	90	20,0	57,5	22%	64%	38,4	59,7	43%	66%	30,2	49,0	34%	54%
	DV 110 kV NEUM - NEUM	90	54,7	21,7	61%	24%	56,8	41,0	63%	46%	41,3	32,5	46%	36%
	DV 110 kV SL.BROD 2 - BOS.BROD	123	20,9	59,6	17%	48%	34,9	54,6	28%	44%	39,6	51,2	32%	42%
	DV 110 kV TREBANJE - KOMOLAC	84	29,6	73,4	35%	87%	44,9	64,0	53%	76%	78,3	55,8	93%	66%
	DV 110 kV ŽUPANIJA - ORAŠJE	90	8,8	54,5	10%	61%	23,0	56,6	26%	63%	16,6	59,4	18%	66%
220	DV 220 kV ĐAKOVO - GRADACAC	311	99,5	48,4	32%	16%	93,3	64,2	30%	21%	100,0	57,9	32%	19%
	DV 220 kV ĐAKOVO - TUZLA	311	134,2	40,2	43%	13%	157,7	22,2	51%	7%	170,0	20,1	55%	6%
	DV 220 kV MEĐURČE - PRIEDOR	297	165,8	200,5	56%	68%	218,2	126,2	73%	42%	196,3	105,0	66%	35%
	DV 220 kV MOSTAR - ZAKUČAC	297	251,3	223,7	85%	75%	215,5	171,5	73%	58%	211,1	120,4	71%	41%
	DV 220 kV PLAT - TREBNE 1	257	88,3	102,4	34%	40%	92,2	111,3	36%	43%	109,5	91,6	43%	36%
400	DV 220 kV TEŠAK - PRIEDOR	297	152,8	183,0	51%	62%	210,7	176,9	71%	60%	220,7	152,1	74%	51%
	DV 400 kV ERNEŠTOVO - UGLJEVK	1330	532,5	457,3	40%	34%	737,1	397,6	55%	30%	602,8	379,8	45%	29%
	DV 400 kV MOSTAR - KONJSKO	1330	514,5	377,4	39%	28%	523,2	415,2	39%	31%	612,8	286,0	46%	22%

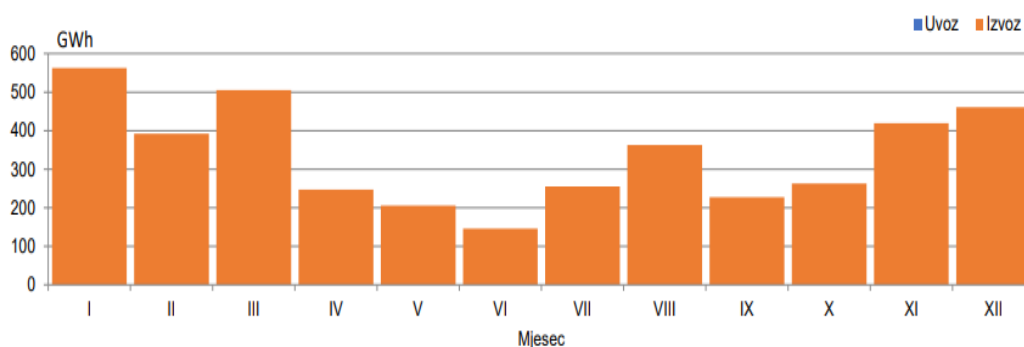
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For the purpose of this analysis, a comment was requested from the company Elektroprijenos BiH on the topic of the frequency of lack of transmission capacities as well as the quantification of energy that should have been transmitted but could not be due to lack of transmission capacities. Elektroprijenos could not quantify the frequency and the lost transmission of energy but confirmed that such situations are not uncommon. We cite the answer: "Participation in exchanges of electricity with neighbouring transmission systems, in addition to exports/imports from BiH, largely have transit flows that change in daily activities, from east to west and vice versa. Actual electricity flows often do not reflect planned flows. On several occasions, due to overload and congestion, further transactions were suspended, as well as exchanges at the border with Croatia and Montenegro, although there was an available ATC."

4.1.1 Electricity production and consumption in BiH

BiH produces more electricity than it needs. Electricity consumption is stagnating, i.e. it is in a slight decline, while production has a trend of growth. Therefore, it is expected that BiH will have higher electricity surpluses in the time to come, given that, for now, there are neither demographic nor economic trends that would increase the level of electricity consumption. Increasingly active electricity markets are leading to electricity being transferred between electric utilities from Slovenia and Hungary to Macedonia, Albania and Greece in the south and south-east. **The flow of electricity will grow over time, which will lead to the need to increase the transmission capacity of the network as well as an increase in its reliability.**

Table 7 Exchange, electricity import-export ratio in BiH in 2020

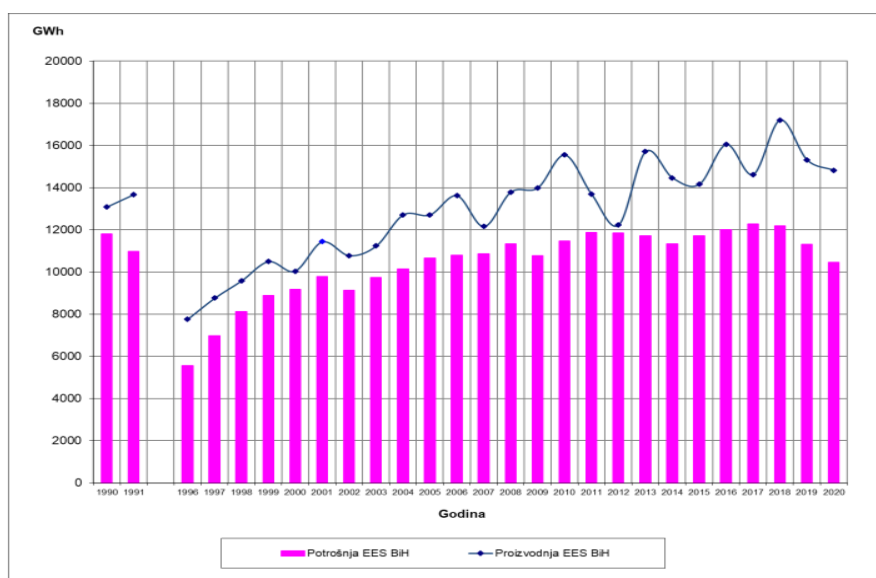


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According to the document of the ISO BiH ¹⁷, this country exported 9,069 GWh of electricity in 2020 and imported 5,021 GWh. 3,525 GWh of electricity passed through the transmission network of BiH. The exchange amount is shown in tables 7, 10 and 11 and figure 10.

Considering the plans to intensify the production of electricity from renewable energy sources, it is interesting to see the speed of change in production and consumption in Bosnia and Herzegovina. There is a noticeable trend of declining consumption with simultaneous fluctuations in production, but with a constant trend of increasing in production. In the future, due to strong investment in renewable energy sources, further growth of electricity production in BiH can be expected.

Table 8 The ratio of production and consumption of electric energy in BiH from 1990 to 2020¹⁸



The numbers of electricity consumption in BiH are shown in Table 9 where the data on its increase or decline in various sectors are visible. The table shows a decline in total industrial consumption, a slight increase in household

¹⁷ ISOBiH: Indicative Production Development Plan 2022-2031, <https://www.nosbih.ba/files/2021/04/20210402-lat-Indikativni-plan-razvoja-proizvodnje-2022-2031.pdf>, p. 14, access: 4/2/2024.

¹⁸ Ibid, p. 21.

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consumption and in total a decline in consumption at the level of the entire BiH. These data indicate that with an additional increase in electricity production, especially from renewable energy sources, BiH will be able to increase the export of electricity produced. However, for this, transmission capacities need to be increased.

Table 9 Electricity consumption in BiH by sectors and timetable from 2013 to 2019.¹⁹

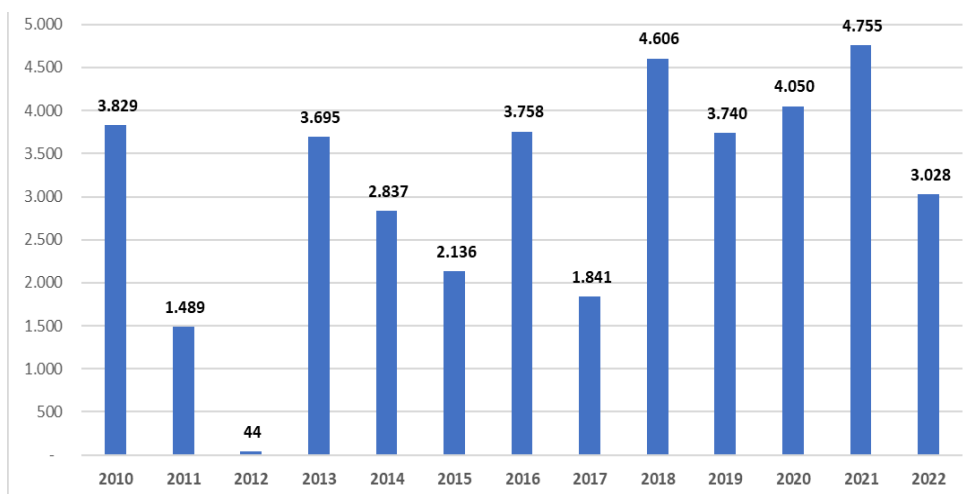
GWh	2013	2014	2015	2016	2017	2018	2019
Industrija željeza i čelika	793	732	773	813	820	819	847
Hemijska (uklj. i petrohemijsku)	104	108	118	127	136	140	152
Metali bez željeza	1.969	1.762	1.712	1.667	1.728	1.784	974
Nemetalni mineralni proizvodi	154	156	164	158	168	122	148
Transportna oprema	35	41	45	50	53	75	37
Mašine	216	194	201	228	290	276	282
Rudarstvo i kamenolomi	75	95	87	93	92	75	102
Prerada hrane, pića i duhana	195	214	228	255	264	266	326
Celuloza, papir i štampanje	190	159	202	189	229	221	212
Drvo i drveni proizvodi	156	148	168	177	179	189	218
Tekstil i koža	84	115	115	101	174	187	134
Nespecificirano (industrija)	118	125	118	156	148	150	185
Industrija ukupno	4.297	4.089	3.849	4.014	4.281	4.304	3.617
Industrija (%)	38,7%	37,4%	36,4%	36,2%	37,6%	37,6%	32,9%
Saobraćaj	107	84	80	73	76	59	59
Saobraćaj (%)	0,9%	0,7%	0,8%	0,7%	0,7%	0,5%	0,5%
Domaćinstva	4.599	4.624	4.605	4.733	4.756	4.685	4.726
Domaćinstva (%)	41,4%	42,3%	43,5%	42,7%	41,7%	40,9%	43%
Građevinarstvo	86	60	61	65	63	63	73
Poljoprivreda	90	84	53	67	48	62	59
Ostali potrošači	1.918	2.027	1.939	2.136	2.174	2.283	2.459
Ostala potrošnja ukupno	2.201	2.255	2.133	2.341	2.285	2.467	2.650
Ostala potrošnja ukupno (%)	19,9%	20,3%	20,1%	21,1%	20,0%	21,5%	24,1%
FINALNA POTROŠNJA	11.097	10.933	10.587	11.088	11.398	11.456	10.993

Page 15 of the same document provides an overview of the relationship between the import and export of electricity with regard to the countries bordering BiH (Figure 15). It is clear that BiH has, in total, the most intensive transmission of electricity with the Republic of Croatia.

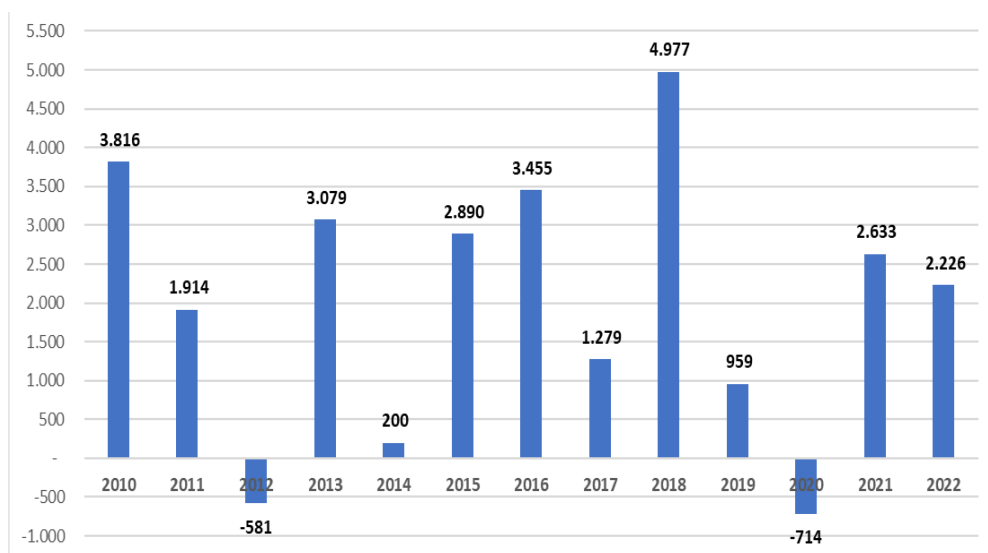
¹⁹ Ibid, p. 25.

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*Table 10 Total annual electricity surplus (GWh) exported from BiH to
neighbouring countries (Croatia, Serbia and Montenegro)*



*Table 11 Total difference in annual export/import of electricity (GWh) from BiH
to Croatia*



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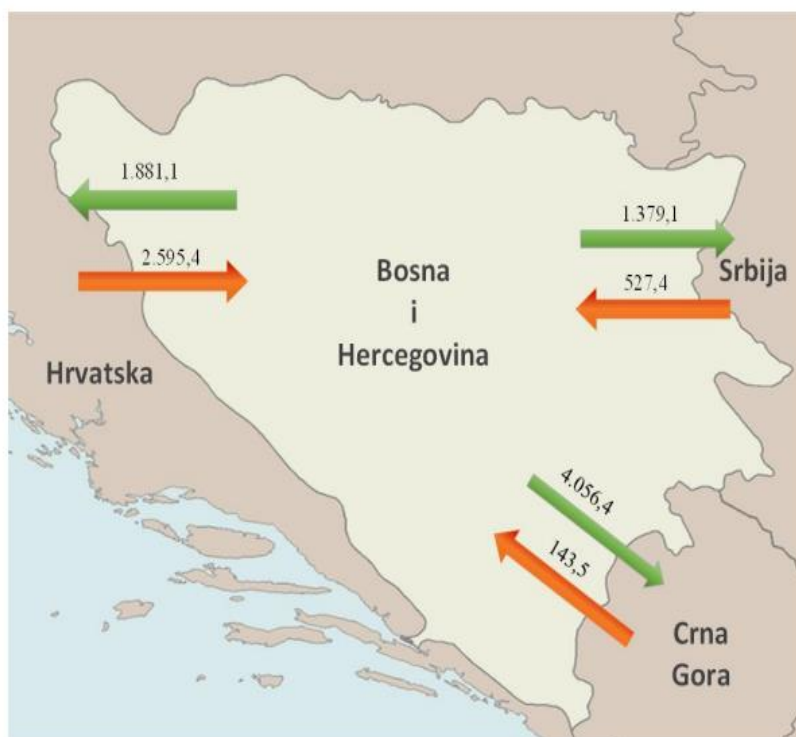


Figure 15 Energy transfer to BiH and from BiH in 2020²⁰

²⁰ Ibid, p. 15.

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*Table 12 Cross-border electricity flows (GWh) from BiH to neighbouring
countries ²¹*

Država	2010			2011			2012			2013			2014			2015			2016		
	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika
Hrvatska	4.942	1.127	3.816	3.522	1.608	1.914	1.938	2.519	- 581	4.206	1.127	3.079	2.155	1.955	200	4.109	1.219	2.890	4.657	1.202	3.455
Srbija	361	1.321	- 960	316	2.158	-1.842	448	1.670	-1.222	538	1.524	- 986	613	996	- 383	265	2.103	-1.838	433	1.263	- 830
Crna Gora	1.602	629	973	1.822	405	1.417	2.139	292	1.847	2.118	516	1.602	3.230	210	3.020	1.633	549	1.084	1.751	618	1.133
Ukupno	6.905	3.076	3.829	5.660	4.171	1.489	4.525	4.481	44	6.862	3.167	3.695	5.998	3.161	2.837	6.007	3.871	2.136	6.841	3.083	3.758
Država	2017			2018			2019			2020			2021			2022					
	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika	Izvoz	Uvoz	Razlika			
Hrvatska	2.909	1.630	1.279	5.963	986	4.977	2.767	1.809	959	1.881	2.595	- 714	4.414	1.781	2.633	3.898	1.672	2.226			
Srbija	449	1.405	- 956	489	1.003	- 514	1.085	822	263	1.379	527	852	814	879	- 65	643	1.249	- 606			
Crna Gora	1.829	311	1.518	1.246	1.103	143	2.712	195	2.518	4.056	144	3.913	2.787	599	2.187	2.315	907	1.408			
Ukupno	5.187	3.346	1.841	7.698	3.092	4.606	6.565	2.825	3.740	7.317	3.266	4.050	8.014	3.259	4.755	6.856	3.829	3.028			

²¹ ISO BiH: Report on electricity flows on the transmission network in Bosnia and Herzegovina for 2020, ISO BiH

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The document entitled "Long-term transmission network development plan 2021-2030" created by Elektroprijenos BiH also presents the result of the power balance calculation for the EES of Bosnia and Herzegovina, Croatia, Serbia and Montenegro in the model for the TTC calculation. This result is visible in Table 13:

Table 13 View of the Long-Term Development Plan 2021-2030

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E ELEKTROPRIENOS BIH-MAKSIMALNI REZIM DUGOROCNI PLAN RAZVOJA 2021-2030. GODINA - 2030. GODINA												
FROM -----AT AREA BUSES-----							AREA TOTALS IN MW/MVAR					
X-- AREA --X	GENE- RATION	FROM IND GENERATN	TO IND MOTORS	TO LOAD	TO BUS SHUNT	GNE BUS DEVICES	TO LINE SHUNT	FROM CHARGING	TO LOSSES	-NET INTERCHANGE-- TO TIE LINES	TO TIES + LOADS	DESIRED NET INT
13	2945.2	0.0	0.0	2061.0	0.0	0.0	8.2	0.0	76.2	800.0	800.0	800.0
BA	625.6	0.0	0.0	677.4	0.0	0.0	88.1	910.8	793.3	-22.3	-22.3	
16	3115.0	0.0	0.0	4000.0	0.0	0.0	3.6	0.0	111.3	-999.9	-999.9	-1000.0
HR	866.4	0.0	0.0	937.8	0.0	0.0	21.8	1924.1	1283.0	547.9	547.9	
38	1513.4	0.0	0.0	1024.9	0.5	0.0	4.5	0.0	33.5	450.0	450.0	450.0
ME	345.1	0.0	0.0	396.7	-33.3	0.0	28.6	446.0	457.2	-58.0	-58.0	
46	9256.2	0.0	0.0	8183.3	0.0	0.0	18.8	0.0	204.2	849.9	849.9	850.0
RS	3084.3	0.0	0.0	2690.9	0.0	0.0	70.0	1938.0	2440.6	-179.2	-179.2	
COLUMN	16829.9	0.0	0.0	15269.1	0.5	0.0	35.1	0.0	425.2	1100.0	1100.0	1100.0
TOTALS	4921.4	0.0	0.0	4702.7	-33.3	0.0	208.5	5218.9	4974.1	288.3	288.3	

From the results of the model developed by the EES BiH in the planning process, it is clear that there are electricity shortages in Croatia and surpluses in BiH, Serbia and Montenegro.

Table 14 The result of the TTC calculation for 2030

Year	Direction					
	BA > HR	HR > BA	BA > RS	RS > BA	BA > ME	ME > BA
	MW	MW	MW	MW	MW	MW
2020.	1000	1000	600	600	500	500
2030.	1350	1350	1000	1300	900	800

From Table 14 it is evident that EES BiH plans to increase the capacity of the transmission network due to planned changes in production and system needs in neighbouring countries. In 2021, a surplus of revenues over expenditures in the amount of 1,433,858 BAM was realized, which completely covered the loss from previous years, which amounted to 1,234,198 BAM. The surplus is the result of both higher revenue, which is a consequence of the application of the tariff from January 1st and increased electricity

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consumption, as well as lower costs and responsible and rational financial policy²².

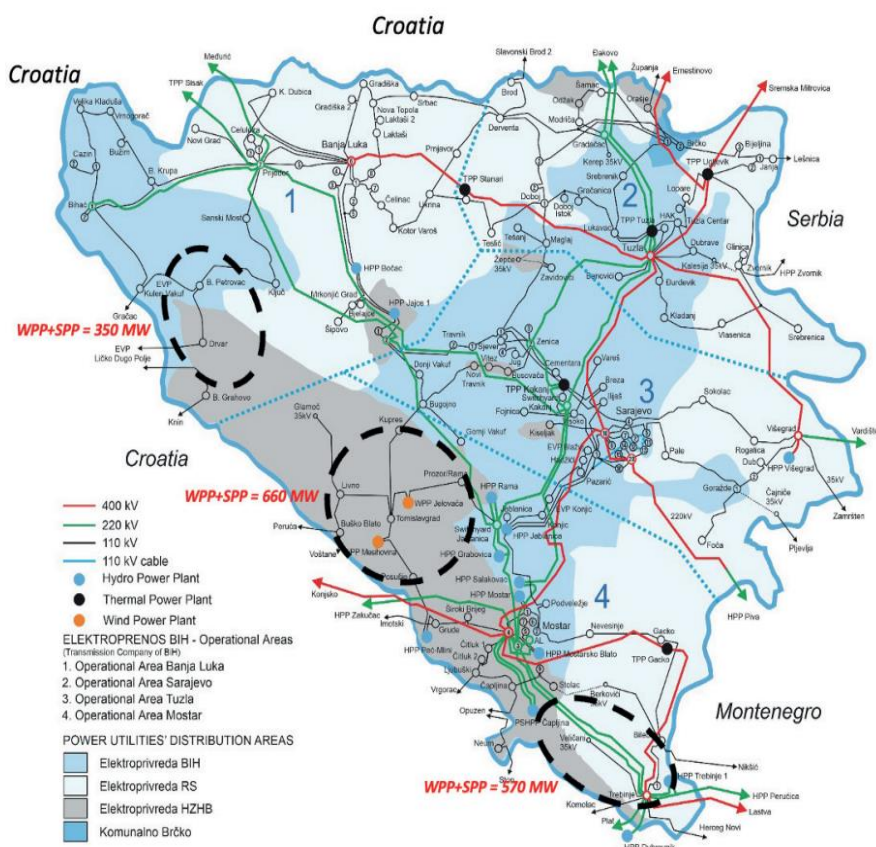
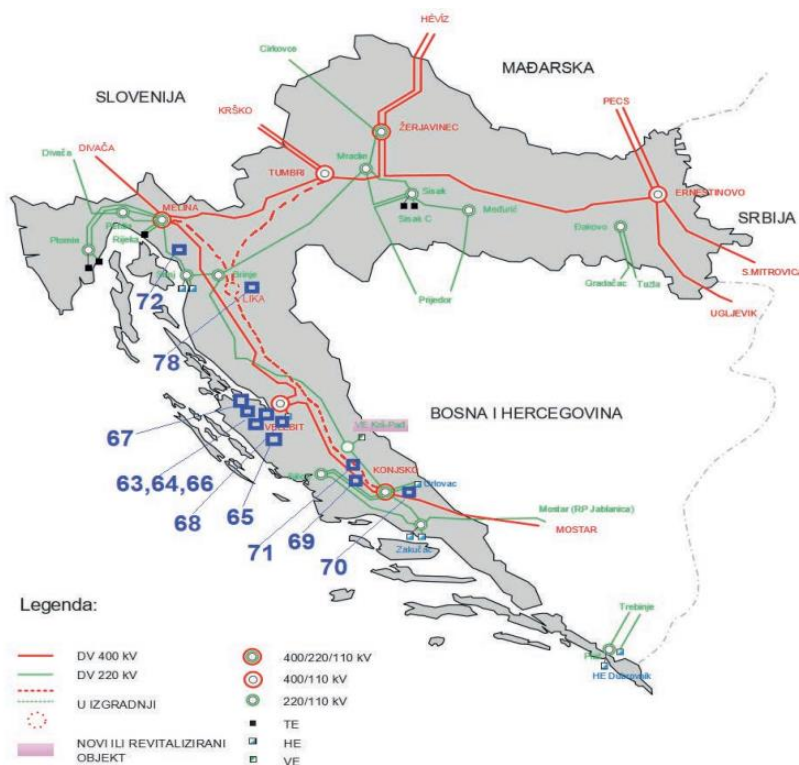


Figure 16 Areas in the Republic of Croatia that could be connected to the transmission network of BiH (ISO BiH, April 2021)²³

²² BiH ISO: <https://www.nosbih.ba/files/2022/09/20220917-hr-Godisnji-izvjestaj-o-radu-NOSBiH-za-2021-godinu.pdf>

²³ RES: Action plan for the necessary reinforcements of the electricity network in order to integrate renewable energy sources in Croatia, <https://oie.hr/wp-content/uploads/2021/12/EBRD-Akcijski-Plan.pdf>, p 50, access 2.4.2024.

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*Figure 17 Croatian HOPS' proposal for the construction of an energy ring of 400 kV and 220 kV of network and reinforcement of Konjsko-Melina*²⁴

In these two figures (16 and 17) you can see the difference in thoughts and plans between the competent institutions in the Republic of Croatia and BiH. The operator from BiH is trying to encourage the Republic of Croatia to build the Croatian part of the energy transmission link on the route Banja Luka – Lika, while Croatia directs its activities to the area of Dalmatia towards the southern part of BiH. Lower population numbers, smaller capacities required by economic entities in the Lika area, and a completely opposite situation in Dalmatia and Herzegovina, highlight the necessity to make decisions that will

²⁴ Ibid, p. 48

strengthen transmission capacities in the south of Croatia and connect, in the energy transmission sector, the south of Croatia with Zagreb to the north and the south of Croatia with Bosnia and Herzegovina to the east, with appropriate transmission systems, using the ring approach.

Unfortunately, due to lack of data on the utilization of the capacities of existing transmissions between BiH on the one hand and Serbia and Montenegro on the other, the necessity to build additional capacities for the electricity transmission on these transmission routes cannot be assessed.

4.1.2 The need for modernization of the electricity network and increase of connections capacity to power systems – Southern Interconnection

What is certain is that EES BiH plans to increase the exchange of electricity with the Republic of Croatia and that this increase should be accompanied by an increase in the capacity of transmission of the electricity network between these two countries.

With the aim of increasing transmission capacities in the conditions of increasing electricity production with an emphasis on renewable energy sources that are in great momentum, as well as due to the need to keep the energy transmission system functional in the foreseeable future, an increase in transmission capacities (Figure 17) from the direction of Konjsko/Zakučac in Croatia towards Mostar (BiH) is imposed as a necessity. It is necessary to work on the construction of a new as well as on the restoration of the existing network (220kV and 110kV). Considering the aspect of redundancy, i.e. enabling the functionality of the system when its individual parts are exposed to certain risks and threats, it is necessary to work on the construction of those parts of the energy transmission system that will be able to function as a Croatian energy ring. The estimated price of this investment is around 900 million Euros, according to experts from HOPS we talked with. These funds would be justified investment in the long run.

The financial viability of building new and intensive renovation of existing transmission capacities with the aim of increasing capacity is never profitable

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in a short run. Over time, this investment benefits owners especially in times of crisis and when it is needed to deliver excess energy to areas that need that energy. Secondary benefits for the population and the economic sector from a system that ensures the supply of sufficient quantities of energy at affordable prices is that it reduces crisis pressure on the population, slows down or prevents an economic crisis. Those are sufficient arguments to initiate a process of long-term investment in national and EU energy transmission capacities in accordance with long-term assessments of its production and transmission.

BiH needs to export surplus electricity, but also to import it in situations when shortages of electricity occur. BiH occasionally imports and exports frequency balancing services of the electrical energy system. BiH has levels of losses in the transmission system that can be reduced. Furthermore, the modern concept of electricity networks envisages the creation (if possible) of local systems that are self-sufficient in terms of energy. The 110 kV network heading from Mostar to Croatia needs serious renovation. It is also desirable to build a new transmission line, i.e. to renew the existing 220 kV network with new materials in order to raise the capacity from the current 300 MW to almost 600 MW of transmission power.

The interconnection of electrical energy networks was a particularly hot topic at the end of the 1980s when Bosnia and Herzegovina and Croatia had an aluminium industry that consumed large amounts of electricity and interruptions in the supply were not an option. With the gradual shutdown of the aluminium industry in both countries and the reduction of the number of inhabitants, the acute need to build additional connections of power systems along with the so-called Nikola Tesla ring (400kV transmission lines in SFRY) disappeared.

Two new trends are also important for the planning of electrical energy infrastructure. The first trend is related to the EU Commission's decisions to reduce GHG emissions by 55% by 2030 and for EU to become fully CO₂-neutral by 2050. BiH is not a member of the EU but has the good will to join the EU. BiH will have to consider decarbonising its industry and energy, i.e. to

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gradually shut down its thermal power plants (TPP). The need for electricity from clean sources in BiH will therefore grow in the next 30 years.

The second trend arose after Russia's aggression against Ukraine in February 2022. Russia's aggression led to a geopolitical and energy shakeup, disruption of Europe's energy supply from Russia and flow of electricity from Ukrainian nuclear power plants (UNE). Rising prices and uncertainty of energy supply raised a number of strategic issues that had not existed in public until then. The most important question is how energy independent a country is and how redundant sources it has for energy supply, i.e. how much energy supply and security it has. In light of these two new trends, the Southern Interconnection of BiH reaches another dimension that is not measurable by current needs and economic/financial parameters of profitability.

The energy markets are well familiar with the terms Convenience Yield and Convenience Pricing. These terms describe the additional price that consumers are willing to pay in order to have the security of disposal e.g. electricity, oil or gas. Convenience Yield is formed from advance energy prices that are increased by the price of safety. With oil, Convenience Yield could be shown as the price of oil on the market (stock exchange) for the next year increased by the price of demurrage fee as it sits in tanks in the home country. That way the paid oil is safely available in a year, regardless of, for example, possible disruptions in the tanker traffic through the Suez Canal and the Strait of Hormuz.

The energy market is also familiar with Convenience Yield and the price of secure supply. The above mentioned data clearly indicate that the energy connection of the Republic of Croatia with Bosnia and Herzegovina in the domain of electricity transmission (in both directions) is of a strategic interest both for Bosnia and Herzegovina, as well as for Croatia and Europe as a whole. According to all projections, Bosnia and Herzegovina should have a permanent production of surplus electricity, which can then, through Croatian HOPS, be delivered to final customers in the EU. That way, BiH is gradually being connected to the processes that exist within the EU, thus strengthening its pro-European future.

4.1.2.1.1 Results and effects of the project

The project of stronger and more intensive power connection of the Republic of Croatia with Bosnia and Herzegovina through expansion and renewal of the existing network should end with the following results:

- **R1** - Achieving an increased transmission capacity that meets both current as well as future projected peak loads.
- **R2** - Security of supply of both BiH and Croatia electricity has been improved.
- **R3** - The level of connection of BiH power system with the European is increased.

4.1.2.1.2 Broader impact of results

- **Sustainable development:**

The principle of sustainable development should be respected when preparing the project and future investment. When implementing the project, it is necessary to adjust the power infrastructure associated with the project itself. Security of electricity supply will give a new incentive to economic activities and thus support the development and growth of cities and municipalities and the content in them.

- **Synergies:**

The project provides preconditions for industrial production and fulfilling the needs of population in cities and municipalities, therefore complementing other infrastructure development projects.

- **Social responsibility:**

The project has a function, among other things, to raise the quality and reliability of electricity supply and perhaps to reduce the price for users. The realization of the project, along with the economic one, has an added value: ensuring better availability of electricity for industry and citizens.

4.1.2.1.3 Who are the beneficiaries/target group?

The following methods have been used to define target groups and end-users, as well as to identify their needs:

- analysis of the situation in sectors,
- analysis of the state and possibilities of development of entrepreneurship
- consultation of regional development plans, current situation, needs and goals of economic development
- analysis of the expression of interest (and profiles) of potential users
- analysis of the economic and financial sustainability of the transmission system management company that would be founded.

Based on the conducted analyses and interviews, the needs of target groups and final users are defined. Given the complex nature of the project, the target groups are categorized by sectors: population, tourists, industry.

Population

According to the 2022 census, 3,555,222 inhabitants were listed in BiH. The average age of the inhabitants is 43.9 years. Whole population belongs to the direct target group that will be able to achieve benefits through the realization of this project. The results of the project indirectly affect the entire community. It is undeniable that the project would enable a better and safer supply of electricity to the population as well as to the service sector in BiH. Additional capacities of the system could support the growth of electricity needs in the summer period when the need for energy is the highest and the production of energy from hydropower plants (HPP) is at the lowest.

Tourists

The territory of the Federation of BiH ²⁵ had a number of 120,316 tourist visits during October 2023, with the number of overnight stays at 223,305. These data represent an increase of 21.4% more tourist arrivals and 17.7% more overnight stays compared to October of the year before. Looking at the total area of BiH ²⁶, during 2022 there were 1,464,216 visitors (growth of 50.7%) with 3,194,681 overnight stays (growth of 41.4% compared to 2021)²⁷.

It is undeniable that the project would enable a better and safer supply of gas to the tourism and hospitality sector throughout BiH.

Industry

The project will result in security of electricity supply and possible reduction of electricity production costs as well as its usage costs. BiH will also feel additional benefits that will further influence the positive indirect consequences of the realization of this project: increasing the interest of entrepreneurs in investing in capital facilities and infrastructure that needs electricity.

4.1.3 Demand analysis

BiH citizens and industry and numerous visitors are consumers of electricity distributed through the power system. According to available data, BiH is stagnating with a slight decrease in electricity consumption. According to available data and publicly known plans, no industrial facilities are planned in BiH that would consume a lot of electricity (e.g. the renewal of aluminium

²⁵ <https://radiosarajevo.ba/vijesti/bosna-i-hercegovina/porast-turista-evo-iz-kojih-zemalja-najvise-ih-je-doslo-u-bih/523219>

²⁶ Bljesak.info. Returning to the old figures: In 2022, BiH was visited by almost one and a half million tourists, on February 7, 2023; <https://bljesak.info/gospodarstvo/turizam/bih-u-2022-godini-posjetilo-skoro-milijun-i-pol-turista/409182>

²⁷ It should be taken into account the fact that 2021 was also a part of those years known collectively as Covid-19 years due to limited mobility and travel options.

production is unlikely because BiH does not have an abundance of cheap electricity, which is the main cost of production in electrolysis industry).

4.1.4 Available technological solutions

The construction of a new transmission line or ground line must meet the economic, ambient and urban conditions of space in the entire area of the project, both with its capacity and quality of its facilities and infrastructure. Technical documentation (project and necessary studies) must consider and include solutions for the construction of a new electricity connection. The technical documentation in question must also offer the improvement of the existing electricity infrastructure. At the same time, work needs to be done on the restoration of existing transmission systems with more modern materials that can achieve greater transmission capacity.

4.2 Gas system of BiH and connection with neighbouring countries

BiH does not have its own gas sources. All the gas that Bosnia and Herzegovina currently imports comes from Russia, through the transport systems of Turkey, Bulgaria and Serbia (the so-called Turkish Stream shown in Figure 19). BiH planned the construction of an underground gas storage facility, but this project was never realized so BiH depends on continuous gas imports. Construction of transmission and distribution pipelines in BiH began during the SFRY. The first consumer of natural gas was the alumina factory "Birač" in Zvornik completed in 1979. In the same year, the construction of the Zvornik-Sarajevo gas pipeline was completed, and the city of Sarajevo was connected to the gas pipeline system. There are several initiatives for the construction of new gas pipelines in Bosnia and Herzegovina coming from BiH but also from neighbouring countries. However, they run into a number of problems, mostly those of political nature. Figure 18 shows transmission and distribution pipelines between BiH and neighbouring countries both existing and planned.

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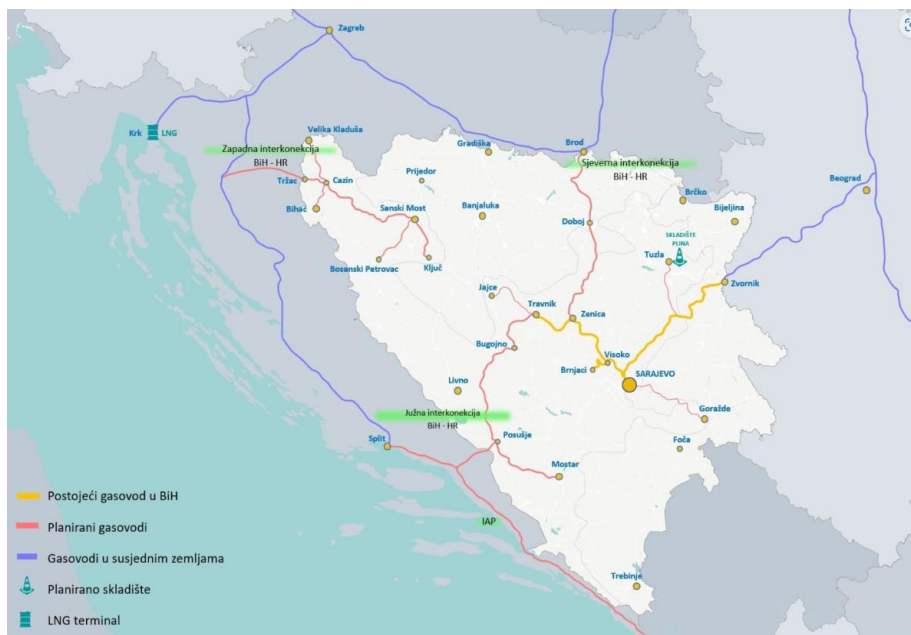


Figure 18 Transmission and distribution pipelines in BiH – existing and planned
28

Burning gas instead of coal produces less CO₂ emissions and the EU Commission considers it an acceptable "transitional" energy source. New gas pipelines can be constructed from alloys and can that way be acceptable for the transport of hydrogen that is considered the energy source of the future.

A gas pipeline with the largest gas transmission capacity is the one which takes gas over at the interconnection along the Drina River in Serbia (the gas entrance to BiH is in Šepak near Zvornik). The capacity of the aforementioned natural gas transmission system, currently the only one in BiH, is about 750 million Sm³/year, the contracted capacity is 600 million Sm³/year, and the designed pressure is 50 bar. The average operating pressure is about 28 bar. In the last 10 years, consumption has gradually increased from 226 million

²⁸ RES: Action plan for the necessary reinforcements of the electricity network in order to integrate renewable energy sources in Croatia, <https://oie.hr/wp-content/uploads/2021/12/EBRD-Akcijski-Plan.pdf>, p 50, access 2.4.2024.

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Sm³ to 254 million Sm³ (in 2021). Gas consumption in 2021 was at the level of 63% of pre-war consumption. The pipeline in BiH is operated by a company BH Gas.



Figure 19 Turkish Stream pipeline to which the existing BiH gas pipeline and distribution pipelines in BiH are connected – existing and planned ²⁹

A gas pipeline connecting the oil refinery (OR) Bosanski Brod with a gas pipeline in the Republic of Croatia (the so-called Northern Interconnection) has a much smaller capacity. This connection is intended only for the needs of the mentioned refinery.

Table 15 (as well as Figure 20) shows the movement of gas consumption in BiH in the period from 2016 to 2021. According to these data, it can be seen that gas consumption in the energy sector is at the level of 25% of the total imported amount of gas on an annual basis.

Table 15 Annual import and consumption of natural gas in BiH, and gas consumption in the energy sector of BiH in m³

²⁹ Energy of the Balkans: Dangerous charges from BH Gas- Serbia runs the fBiH gas system, Jelica Putniković, 8.4.2021., Dangerous accusations from BH-Gas - Serbia runs the gas system of fBiH - Energy of the Balkans, access 2.4.2024.

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	2016	2017	2018	2019	2020	2021
Uvoz i potrošnja prirodnog plina (1000 Sm³)	226.927	245.415	247.012	234.612	213.379	254.790
Potrošnja u energetsom sektoru (1000 Sm3)	59.362	61.747	61.672	58.217	60.128	65.551

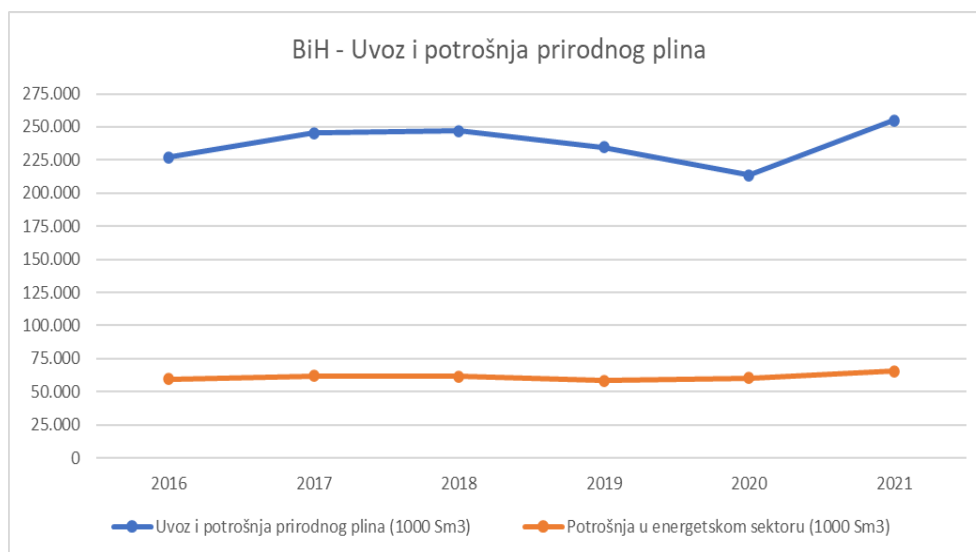


Figure 20 Annual import and consumption of natural gas in BiH, and gas consumption in the energy sector of BiH

4.2.1 Demand analysis

The population of BiH, industry and tourists are consumers of gas that is distributed through the pipeline system. According to available data, gas consumption in BiH stagnates in the analysed period from 2018 to 2022. Gas consumption would certainly increase if the network of distribution pipelines were expanded and if the transition of industry to the use of gas as an energy source for the needs of technological processes was encouraged.

4.2.2 Available technological solutions

The construction of a gas pipeline that would connect the existing gas pipeline in Croatia with the system in BiH through Southern Interconnection would have to meet the economic, ambient and urban conditions of space in the

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entire zone of project intervention, both with capacity and infrastructure. Technical documentation (project and necessary studies) must consider and include the solutions of the complete system and connections to the existing gas pipeline network in BiH. The technical documentation in question must also offer the improvement and expansion of the existing gas pipeline infrastructure.



Figure 21 A more detailed overview of the existing and planned gas pipelines in BiH

4.2.3 Pipeline construction plan (including infrastructure utilization)

The plans for the construction of the Southern Interconnection with a pipeline with a pipe diameter of 50 cm, a pressure of 75 bar with the expected cost of construction of the connection from the current point in Dugopolje (Croatia)

to the entrance to BiH of about 160 million Euros is heading in this direction. The built pipeline would provide the necessary quantities of gas, security of supply and availability throughout the project scope, i.e. all parts of BiH that would be directly connected to the new pipeline. The revenues of the company that would operate the pipeline would be generated from the sales of gas transmission services.

4.2.4 Gas consumption in BiH

The planned gas pipelines listed further in the tables are charted in the spatial plans of neighbouring BiH countries and are listed in the plans for the construction of gas transmission systems. The tables that follow list all existing and planned gas pipelines between BiH and neighbouring countries. The intensification of the gas connection of Bosnia and Herzegovina through the Republic of Croatia with other gas sources is clear. It is necessary, in order for Bosnia and Herzegovina to be truly independent, that this supply route supplies Bosnia and Herzegovina with gas that comes not only by other means but also from other sources not related to Russia.

Based on a direct inquiry sent by IDPI to BH Gas with a request for information on the storage and consumption of natural gas, and on the capacities of the transmission system, an official response came containing the following information:

- BiH does not have a natural gas storage facility;
- The annual consumption of natural gas is 230 million m³ +/-10%, which represents about 30% of the annual capacity of the transmission system;
- In BiH, there is a large seasonal unevenness of consumption (daily maximums in the winter period are almost equal to technical capacity).

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Table 16 Gas pipelines between BiH and neighbouring countries

Croatia - BiH	Total	Serbia - BiH	Total	Montenegro - BiH	Total
Gas pipeline	1	Gas pipeline	1	Gas pipeline	0
Pipeline (planned)	2	Pipeline (planned)	1	Pipeline (planned)	0

In the annual report for 2021 and in the maximum technical monthly capacities (in m³/month) for 2023/2024 Gas Promet lists the values of gas entering from Serbia to the pipeline in BiH (Table 17). An overview of the quantities of gas planning to be imported from Serbia is shown in Table 18.

Table 17 Monthly amounts of gas in gas pipeline BiH-Serbia³⁰

Month	ENTRANCE:
	ŠEPAK
X	21.000.000
XI	21.000.000
XII	21.000.000
I	21.000.000
II	21.000.000
III	21.000.000
IV	21.000.000
V	21.000.000
VI	21.000.000
VII	21.000.000
VIII	21.000.000
IX	21.000.000
TOTAL	252.000.000

³⁰ <https://www.gaspromet.com/kapaciteti-sistema-za-gasnu-godinu-g1/>

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Considering that, before the war, BiH annually imported up to 400 million m³ of gas per year using this pipeline, and that today quantities between 250 and 265 million m³ of gas are imported per year through the same pipeline, it is clearly visible that the capacity of this pipeline is not sufficiently used. Therefore, it can be expected that Russia and Serbia will intensify activities in order to increase the transmission of Russian gas through this pipeline in the future. They will do so in order to try to influence the financial benefits and cost-effectiveness of the construction of the Southern Gas Interconnection. They will also try to influence the operator who will be managing this pipeline (if it comes to its realization).

Table 18 Planned gas transmission volumes 2023/2024³¹

Planned gas volumes 2023/2024		
Month	ENTRANCE: ŠEPAK	m ³
	kWh/day	
X	3.411.902	10.583.543
XI	3.411.902	10.583.543
XII	3.411.902	10.583.543
I	3.411.902	10.583.543
II	3.411.902	10.583.543
III	3.411.902	10.583.543
IV	3.411.902	10.583.543
V	10.182.413	31.585.316
VI	13.451.356	41.725.407
VII	13.451.356	41.725.407
VIII	13.451.356	41.725.407
IX	10.182.413	31.585.316
TOTAL	84.602.208	262.431.650

³¹ <https://www.gaspromet.com/kapaciteti-sistema-za-gasnu-godinu-g1/>

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Building a gas pipeline is an expensive investment. The price of the pipeline construction is included in the price of gas delivered to final customers. The construction of the pipeline is expected to be financially justified and profitable only after 500 million cubic meters of imports per year. Given the current level of consumption and gasification (distribution network that is underdeveloped), the construction of new transmission pipelines would not be profitable in the case of BiH.

However, BiH plans to connect to the Southern Interconnection, which would allow it to have access to gas supplies from two directions, Serbia and Croatia. However, in the planning processes of the construction of new and independent energy supply routes, financial calculation is not the only variable, but also numerous other factors need to be considered as they affect the valuation and decision-making on the need to build a new energy supply route at the secondary and tertiary level. Therefore, although the pipeline that would connect Bosnia and Herzegovina with other, independent from Russia, gas suppliers may not have a primary financial justification, its construction is a necessity in order to:

- a) Bosnia and Herzegovina be completely energy (in this case gas is the energy source) independent from the existing supplier that can manipulate the prices and quantities of gas it delivers if it has a monopoly on the market
- b) Develop more evenly (economically, socially, demographically) other areas of BiH with the help of additionally available energy source (gas).

4.2.5 New Eastern (Gas) Interconnection

Figure 22 shows an additional gas pipeline (the so-called "New Eastern Interconnection") by which a part of Bosnia and Herzegovina (the western part of Republika Srpska) was planned to connect to the Turkish Stream, in the area of Bijeljina.

The entire investment in the construction of the pipeline would be paid by Russia's Gazprom. According to the original plan, the gas from this pipeline

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was also intended for the needs of refineries in Brod and Modriča (both Russian-owned). It was also planned to build a gas thermal power plant. It should be noted that this pipeline that would move Russian gas should come to the border with the Republic of Croatia. It is to be expected that there would be an increase in propaganda activities that would try to portray this gas as a cheap and safe source of gas for the needs of the population of the Republic of Croatia, first in the Banovina area and then beyond. It should also be emphasized that the existing plan for the construction of the Northern Interconnection (visible in Figures 8 and 21) is in direct collision with the proposal to build this pipeline.



Figure 22 Gas pipeline to Banja Luka and Croatia "New Eastern Interconnection" from Turkish Stream³²

³² N1 BiH: New Russian gas pipeline for BiH stopped on Drina, Dodik rejected six times, 3.11.2022.; <https://n1info.ba/vijesti/na-drini-zaustavljen-novi-ruski-plinovod-za-bih-dodik-odbijen-sest-puta/>

4.2.6 Southern (gas) Interconnection

The area of Herzegovina does not have gas pipelines to gain access to gas for the needs of industry and households as can be seen from Figures 21 and 23. The central part of BiH, as well as the city of Sarajevo and the eastern part of BiH, have gas supplied from only one, Russian, source through the existing pipeline. Given the need to build energy supply routes that should be completely independent of existing energy sources (especially when the supplier uses them as a tool to manipulate and impose their political interests, and when it directly threatens the independence and stability of the state that depends on these energy sources), an initiative to build the Southern Interconnection has been launched. This pipeline would supply BiH with gas, which would come through Croatia, using Plinacro pipelines independently of Russia. Therefore, in addition to the construction of the pipeline, the choice of reliable and safe suppliers, it is necessary to consider the third factor that can affect the stability and security of supply: the management structure (legal and natural persons).

Plinacro describes the importance of this pipeline ³³:

The Southern Interconnection of gas transmission systems of Croatia and Bosnia and Herzegovina on the route Zagvozd -Imotski – Posušje – Tomislavgrad - Zenica with a branch to Mostar has a strategic importance for the security of supply for Bosnia and Herzegovina, since it currently depends on only one connection to the gas transmission system, namely from Serbia, through Republika Srpska. The project ensures diversification of routes and sources of supply (through the LNG terminal on the island of Krk, the future Ionian-Adriatic gas pipeline and other supply routes that go through the Republic of Croatia) and further gasification of Bosnia and Herzegovina, which will also result in an increase in the transit of natural gas through the Republic of Croatia. Croatian sections of the Southern Interconnection Croatia - Bosnia and

³³ Plinacro: Southern interconnection Croatia/BiH: PLINACRO d.o.o. - Gas transmission system operator - Southern interconnection Croatia/Bosnia and Herzegovina

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Herzegovina include the Dugopolje -Zagvozd section with a total length of 52 km and the section Zagvozd – Imotski - border of Croatia and Bosnia and Herzegovina with a total length of 22 km, while on the Bosnian and Herzegovinian side the total length of the route is 169 km. The projected interconnection capacity is up to 1.5 billion m³ per year. The planned completion of the project is in 2024.



Figure 23 A more detailed overview of the existing and planned gas pipelines in BiH with an emphasis on the Southern Interconnection

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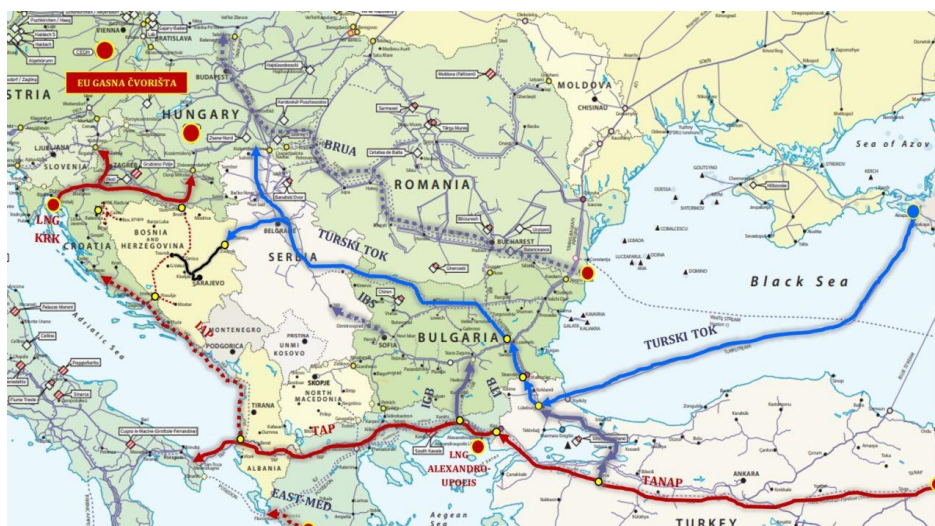


Figure 24 Comparison of Turkish Stream and Southern Interconnection ³⁴

³⁴ Pipeline map | Company for gas production and transport BH-Gas d.o.o. Sarajevo

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Figure 25 A more detailed overview of the existing and planned gas pipelines in BiH with an emphasis on the Southern Interconnection³⁵

BiH would be given additional capacity to supply gas to industry and population through the Southern Interconnection and liberate itself from dependence on gas supplies (Russian) that now arrive via a gas pipeline through Serbia (Figure 24). This project would also provide several measurable secondary and tertiary results:

- **R1** - Conditions have been created for additional gas consumption in BiH
- **R2** - Conditions have been created to replace coal and electricity with gas as heating energy source

³⁵ N1 BiH, Preliminary design of the gas pipeline South Interconnection of BiH and Croatia completed, 6.5.2020.; <https://n1info.ba/vijesti/a431354-završen-idejni-projekt-gasovoda-juzna-interkonekcija-bih-i-hrvatske/>

- **R3** - An increase in transmission capacity that meets the current peak gas needs in BiH has been achieved
- **R4** - Security and reliability of gas supply to BiH is improved
- **R5** - Reduction of CO2 emissions due to coal being replaced with gas

4.2.6.1 Wider impact of results

- **Sustainable development:**

The principle of sustainable development is important in the preparation of the project and in its realization during the future investment. After the realization of the project, the distribution gas infrastructure will be arranged, which is directly related to the project itself. Security of gas supply will give a new incentive to economic activities and thus support the development and growth of cities and municipalities and the content in them.

- **Synergy effect:**

The project provides preconditions for meeting the existing and increasing industrial and other production that will use gas in its business and production processes as well as for the needs of the population in cities and municipalities. This project will be complemented by other projects for the development of critical and social infrastructure.

- **Social responsibility:**

The project has the function, among other things, to raise the quality and reliability of gas supply as an energy source and perhaps to reduce the final price for its users by abolishing the existing monopoly. The realization of the project, in addition to the economic one, has an added value, which is ensuring the availability of gas for industry and citizens.

4.2.6.2 Who are the beneficiaries/target group?

The following methods have been used to define target groups and end-users, as well as to identify their needs:

- analysis of the situation in sectors,
- analysis of the state and possibilities of development of entrepreneurship
- consultation of regional development plans, situation, needs and objectives of economic development
- Analysis of the expression of interest (and profiles) of potential users.

Based on the conducted analyses and interviews, the needs of target groups and final users are defined. Given the complex nature of the project, the target groups are categorized by sectors: population, tourists, industry.

Population

According to the census from 2022, there are 3,555,222 inhabitants in BiH, and the average age of the inhabitants is 43.9 years. Whole population belongs to the direct target group that would be able to achieve benefits through the realization of this project. The results of the project indirectly affect the entire community. The project would contribute to a safer and probably cheaper supply of consumers with an elementary civilizational need – energy for affordable heating during the winter.

Tourists

The territory of the Federation of BiH ³⁶ had a number of 120,316 tourist visits during October 2023, with the number of overnight stays at 223,305. These data represent an increase of 21.4% more tourist arrivals and 17.7% more overnight stays compared to October of the year before.

³⁶ <https://radiosarajevo.ba/vijesti/bosna-i-hercegovina/porast-turista-evo-iz-kojih-zemalja-najvise-ih-je-doslo-u-bih/523219>

Looking at the total area of BiH ³⁷, during 2022 there were 1,464,216 visitors (growth of 50.7%) with 3,194,681 overnight stays (growth of 41.4% compared to 2021)³⁸.

It is undeniable that the project would enable a better and safer supply of gas to the tourism and hospitality sector throughout BiH.

Industry

The project would result in security of electricity supply and possible reduction of electricity production costs as well as its usage costs. BiH would also feel additional benefits that will further influence the positive indirect consequences of the realization of this project: increasing the interest of entrepreneurs in investing in capital facilities and infrastructure that needs gas as a source of thermal and electric energy.

4.2.7 Analysis of the feasibility of the gas interconnection project

4.2.7.1 Demand analysis

The population of BiH, industry and tourists are consumers of gas that is distributed through the pipeline system. According to available data, gas consumption in BiH stagnates in the analysed period from 2018 to 2022. Gas consumption would certainly increase if the network of distribution pipelines were expanded and if the transition of industry to the use of gas as an energy source for the needs of technological processes was encouraged.

³⁷ Bljesak.info. Returning to the old figures: In 2022, BiH was visited by almost one and a half million tourists, on February 7, 2023; <https://bljesak.info/gospodarstvo/turizam/bih-u-2022-godini-posjetilo-skoro-milijun-i-pol-turista/409182>

³⁸ It should be taken into account the fact that 2021 was a part of those years known collectively as Covid-19 years due to limited mobility and travel options.

**4.2.7.2 Available
technological
solutions**

The construction of a gas pipeline that would connect the existing gas pipeline in Croatia with the system in BiH through the South Interconnection would have to meet the economic, ambient and urban conditions of space in the entire zone of project intervention, both with capacity and infrastructure. Technical documentation (project and necessary studies) must consider and include the solutions of the complete system and connections to the existing gas pipeline network in BiH. The technical documentation in question must also offer the improvement and expansion of the existing gas pipeline infrastructure. During construction, the pipeline should be prepared for the possibility of transmission of hydrogen as the fuel of the future.

**4.2.7.3 Pipeline
construction and
management
plan**

The built pipeline would provide the necessary quantities of gas, security of supply and availability throughout the zone the project covers i.e. all parts of BiH that would be directly connected to the new pipeline. The revenues of the company that would operate the pipeline would be generated from the sale of the gas transmission service. The company's revenues should cover the costs of business.

The new pipeline would be operated by companies that should be independent of existing, as well as possible future, Russian influences and which should, through their commercial activity, gradually increase financial independence. Maintenance and other operating expenses would be financed from the generated revenues. For the purposes of its functioning, the company would cooperate with companies in BiH and Croatia engaged in gas transmission in BiH and Croatia and its distribution to consumers (in BiH).

4.2.7.4 Personnel

Hiring new employees for the needs of the new company is a consequence of this project, which has a positive effect on preserving the existing potential and encouraging the demographic renewal of BiH.

4.2.8 Moldovan example of good practice and Euro-Atlantic partnership: Iasi-Ungheni-Chisinau Gas Pipeline

As is evident from the analysis so far, Bosnia and Herzegovina is facing numerous challenges that can affect its energy policy, but also the overall social and state processes: economic, security, social, demographic, energy and political. Although BiH has a surplus of electricity production, at the same time it faces serious challenges in the supply of energy sources such as gas or oil. Currently, BiH is supplied with gas only from Russian sources, which have proven to be dependent on the Kremlin's political views. That is, dependent on the energy strategies of the Russian Federation, which are in the function of achieving the Great Strategy of Russia, which seeks to restore undemocratic orders and uses various forms of force and coercion in the realization of its imperial aspirations. Therefore, it is extremely useful to compare the Southern Gas Interconnection project with similar processes in the immediate vicinity, which could serve as a landmark in the search for possible solutions that would move BiH away from complete dependence on the supply of energy from Russia.

We have come to the conclusion that the case of Moldova and its energy dependence on Russia in the context of the existence of Transnistria (the occupied part of Moldova under the control of the Russian Armed Forces and politically pro-Russian circles) can be used as an example that BiH could use as a role model.

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*Figure 26 Moldova and the occupied part of Transnistria*³⁹

Moldova was established at the end of the Cold War, with the collapse of the former Soviet Union. It has about 3.6 million inhabitants, and 75% of the population are ethnic Moldovans. The Russian minority living on the right bank of the Dniester River declared independence and, with the help of members of the Russian armed forces, established power in the area (area of about 3,500 km²) declaring independence and the establishment of the so-called "Pridnestrovskaia Moldavskaya Republic"⁴⁰. In this area a significant part of the Moldovan industry and the only power plant for the production of electricity (powered by gas), Cuciurgan⁴¹ is located, which supplies Moldova with almost 70% of electricity needs.

Moldova's economy showed regular growth in the period from 2007-2019. Agriculture is a fundamental economic activity. Foreign currency deposits sent by Moldovan citizens working abroad to their families represent an essential contribution to its economy.⁴²

³⁹ <https://www.britannica.com/place/Moldova>

⁴⁰ <https://www.britannica.com/place/Transdnistria>

⁴¹ <https://moldgres.com/>

⁴² <https://www.iea.org/reports/moldova-energy-profile>

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Aware of the dependence on Russian gas, in 2014 the construction (completed and became operational in 2015) of the Iasi-Ungheni pipeline was initiated. Moldova is also working to synchronize its electricity network with the European under the ENTSO-E. According to 2020 data, Moldova imports 99% of its oil needs as well as its overall coal needs.⁴³

Moldova, even before the second Russian aggression against Ukraine (February 2022), was extremely dependent on energy from Russia. It did not have the ability to supply gas from sources other than Russia and electricity except from the power plant located in the occupied territory. Russia's strategy was very simple: make Moldova completely dependent on Russian energy and at the same time force the central authorities to buy energy coming from the occupied territory and thus finance the pro-Russian administration in the area. Gazprom has been supplying Transnistria with free energy sources for thirty years, which these authorities then use: (a) for their own use, (b) for the production of electricity, which they then (at market prices) sold to the central authorities in Moldova, and (c) for the sale of gas to Moldova, also at market prices.

Russia has often used its dominant position to try to influence the political processes in Moldova by demonstrating how it operates in the context of modern security challenges faced by states that have strong energy ties with Russia. After pro-European politician Maia Sandu won the October 2021 presidential election, Gazprom demanded that Moldova pay its energy debt of more than \$700 million. An independent audit found that the debt to Gazprom really exists, but that its amount is much lower and that it amounts (in September 2023) to about \$8.6million.⁴⁴

⁴³ Ibid

⁴⁴ <https://ecfr.eu/article/the-final-frontier-ending-moldovas-dependency-on-russian-gas/>

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Table 19 Energy balance of Moldova for 2022⁴⁵

	2022						
	Total	Coal	Natural gas	Oil products	Biofuels and waste	Electricity	Heat
Primary Production	524	-	0	5	499	20	-
From other sources	232	-	-	-	-	232	-
Imports	2,231	77	779	1,282	3	90	-
Exports	194	-	-	184	2	8	-
Stock changes	-23	-13	-69	10	49	-	-
GROSS CONSUMPTION	2,770	64	710	1,113	549	334	-
Transformation, input	373	0	242	83	28	20	-
Transformation, output	301	-	-	4	1	85	211
Energy sector	13	-	0	-	-	12	1
Losses	93	0	20	3	-	40	30
FINAL CONSUMPTION	2,592	64	448	1,031	522	347	180
..Industry	216	10	63	32	2	62	47
..Transport	793	-	15	774	-	4	-
..Residential sector	1,110	38	280	52	489	150	101
..Trade and public services	264	14	84	1	10	123	32
..Agriculture, forestry and fishing	138	2	6	121	1	8	-
..Non-energy use	71	-	-	51	20	-	-

After Russia's aggression against Ukraine, Gazprom reduced gas exports to Transnistria and Moldova by about 50%, while significantly increasing gas prices, leading to problems and energy cuts.⁴⁶ At the same time, Russian attacks on Ukraine's electricity infrastructure led to Moldova no longer being able to get even that part of its electricity (about 30% of its needs). In doing so, Russia tried to influence the strengthening of the pro-Russian attitude among the population of Moldova because there were energy cuts with an increase in the cost of living, for which Russian media communication channels blamed the West and pro-Western politicians in Moldova. Recognizing these processes and their possible devastating consequences, the Moldova authorities turned more strongly towards the EU, which enabled them to procure energy. Moldova initiated processes through which it wanted to abandon such dependence on Russian energy sources. By the end of 2023 Moldova almost completely succeeded in this.

⁴⁵ Energy balance by Supply and consumption, Years and Type of energy products. PxWeb (statistica.md)

⁴⁶ <https://www.power-technology.com/news/recean-moldova-natural-gas-reliance/>

At the end of 2023, Moldova handed over the pipelines, previously operated by Moldovatrangaz, to be managed by VestMoldTransgaz. Moldovatrangaz, the company that had previously operated the pipelines, was part of a company Moldovagaz, which was controlled by Russia's Gazprom.

VestMoldTransgaz⁴⁷ is a company controlled by the Romanian company Transgaz (75%) and the European Bank for Reconstruction and Development (25%). Therefore, control of the pipeline has passed into the hands of reliable Western companies that will not, especially not directly, import Russian gas and will not manipulate the supply and prices in the market.⁴⁸ VestMoldTransgaz has become the temporary operator of Moldova's entire gas pipeline system.

The pipeline was funded by the EBRD and the EIB (\$45million each and they bought 25% ownership of VestMoldTransgaz in mid-2020⁴⁹), financial assistance from Romania (\$600k) and funds from the Government of Moldova, with a \$11million EU's financial injection.⁵⁰

This pipeline consists of two parts:

1. The Iasi-Ungheni gas pipeline, i.e. to the Romanian-Moldovan border by connecting to the existing gas pipeline in the Romanian city of Iasi as shown in the Figure 27. The 33km long pipeline is the first pipeline that Moldova will use to connect with the EU.

⁴⁷ <https://www.vmtg.md/>

⁴⁸ <https://interfax.com/newsroom/top-stories/92384/>

⁴⁹ <https://www.zdg.md/en/?p=4838>

⁵⁰ <https://www.hydrocarbons-technology.com/projects/ungheni-chisinau-natural-gas-pipeline/>



*Figure 27 Iasi-Ungheni Gas Pipeline*⁵¹

2. The Ungheni-Chisinau gas pipeline, which brings gas to the capital of Moldova as shown in the Figure 28 . This pipeline's projected length is 120 km with an estimated construction cost of about \$ 120 million, pipe diameter of 600 mm, working pressure 50 bar, predicted service life of about 25 years (with the possibility of extending to 40 years by replacing individual parts of the pipeline). The maximum transmission capacity is about 1.5 billion m³ of gas per year. The gas supply will be provided by OMV Petrom of Romania, part of the Austrian OMV group.



*Figure 28 Ungheni-Chisina Gas Pipeline*⁵²

⁵¹ https://www.gem.wiki/Romania-Moldova_Gas_Pipeline

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Moldova will invest funds in the production of energy from renewable energy sources (wind and solar) because it has high development potential in these production areas.⁵³

However, it has not yet got rid of the dependence on the supply of electricity from the Cuciurgan power plant located in the occupied area and to which Gazprom continues to supply free gas for electricity production purposes. Given that Moldova, together with its Western partners, is working on connecting to the European electricity network, it is expected that this dependence on the supply of electricity from Transnistria will end in the near future. A high-voltage network is being built to connect Moldova to such a network in Romania. According to project documentation, the network should become functional during 2025. It is expected that there would be a public process of disintegration of this pro-Russian occupation creation because local authorities as well as Russian soldiers based in the area (about 1500 of them) will run out of funds to fill their budget.

Energy independence will enable Moldova's more active and diverse foreign and security policy, will enable gaining more independence, strengthen pro-European narratives in the public, and bring it closer to Euro-Atlantic integration. Of course, the outcome of Russian aggression against Ukraine will have an essential part in this process. At the same time, during this process, Moldovan democracy will be exposed to strong information attacks by Russian and pro-Russian media, political parties and civil society organizations, activating numerous malicious activities from the spectrum of hybrid threats aimed at the democratic system, political processes and the public. All with the aim of returning Moldova to the Russian sphere of interest. It is unrealistic to expect that Russia will peacefully observe the creation of energy independent (from Russia) societies and states⁵⁴, both in

⁵² https://www.gem.wiki/Romania-Moldova_Gas_Pipeline

⁵³ <https://www.atlanticcouncil.org/blogs/ukrainealert/mixed-messaging-from-moldova-on-energy-sector-reforms/>

⁵⁴ During 2021, Russia has offered an access to cheap gas to Moldova through company Gazprom. In Exchange Gazprom asked for political concessions: weakening of Moldovan ties with EU. Moldova rejected that offer. Sources: <https://www.power-technology.com/news/recean-moldova-natural-gas-reliance/>;

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the case of Moldova and in the case of BiH. Therefore, the previously described project in a strategic partnership with the European Union could be a good path in the realization of the Southern Gas Interconnection in BiH.

4.3 BiH oil pipeline system and connectivity with neighbouring countries

BiH does not have its own oil source. It has only one oil refinery (OR) located in Bosanski Brod ⁵⁵. It is supplied with crude oil through JANAF's oil pipeline. The alternative is to transport oil by barges across the Danube and along the Sava, which is an incomparably more expensive variant due to the fact that only small ships that can enter Sava. For the last 10 years, oil consumption in BiH has stagnated, i.e. it is very constant. The capacity of JANAF's pipeline has been slightly exploited.

Table 20 Annual balance of crude oil and feedstock for 2022 for BiH ⁵⁶

1. SIROVA NAFTA I ULAZNE SIROVINE
CRUDE OIL AND FEEDSTOCK

Godišnja bilanca, BiH, 2021
Annual balance, BiH, 2021

	2021	t
Uvoz	12 575	Import
Izvoz	11 541	Export
Saldo залиха	12 998	Stock changes
Raspoloživo za potrošnju	14 032	Available for supply
Utrošak za proizvodnju energije	14 032	Transformation input
Finalna potrošnja	-	Final consumption

The construction of the transmission oil pipeline to BiH is connected with the construction of the receiving and shipping oil terminal (PONT) in Omišalj on the island of Krk in Croatia.

„The Omišalj terminal is located on the northern side of the island of Krk near the town of Omišalj and has the function of receiving,

<https://www.naturalgasworld.com/gazprom-offers-moldova-cheaper-gas-in-exchange-for-weaker-eu-ties-press-93286>

⁵⁵ <https://rafinerija.com/Home>

⁵⁶ https://bhas.gov.ba/data/Publikacije/Saopštenja/2022/ENE_06_2020_Y1_1_HR.pdf

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storing and shipping crude oil and petroleum products to the users of our transport system. The Omišalj terminal area includes two berths for the reception and dispatch of tankers with crude oil or petroleum products and associated equipment.

A great advantage of the terminal is in its natural shelter from strong gusts of wind and the depth of the sea in Omišalj bay, which is approximately 30 meters deep along the berths. For this reason, the tanker port is safe to accept tankers 24 hours a day, throughout the year. The port has the necessary space for sailing in, manoeuvring, docking and departure of even the largest tankers built so far, with a load capacity of up to 500,000 tons.

In total, there are twenty crude oil tanks with a total capacity of 1 400 000 m³. The storage space for petroleum products has a total capacity of 80 000 m³.⁵⁷



Figure 29 JANAFA oil pipeline

An oil pipeline operated by JANAFA d.d. runs from PONT Omišalj. Branches of this pipeline lead to Sisak, towards Hungary, and along the Sava to Slavonki

⁵⁷ <https://janaf.hr/sustav-janafa/terminali/terminal-omisalj>

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Brod and further to Serbia as shown in Figure 29. Bosanski Brod refinery is connected to the oil pipeline of Croatia's JANAf.

Table 21 lists oil pipelines that have been built or that are charted in spatial plans.

Table 21 Oil pipelines between BiH and neighbouring countries

Croatia - Bosnia and Herzegovina	Total	Serbia - BiH	Total	Montenegro - BiH	Total
Oil pipeline	1	Oil pipeline	0	Oil pipeline	0
Oil pipeline (planned)	0	Oil pipeline (planned)	0	Oil pipeline (planned)	0

Table 21 clearly shows that the only connection of BiH with terminals on the Croatian coast is through JANAf's pipeline. As the end of the hydrocarbon era as an energy source looms, the significance and need for oil pipelines will diminish. The needs of the only OR in BiH can be fully met through JANAf's pipeline. There is no economic justification for building new oil refineries and new pipelines.

Table 22 Annual production, import and export of petroleum products in BiH

	2016	2017	2018	2019	2020	2021
Ukupna proizvodnja derivati nafte (t)	823.853	862.784	701.321	75.353	13.062	12.589
Uvoz	1.069.860	1.089.737	1.131.213	1.554.671	1.509.606	1.626.336
Izvoz	220.313	257.071	227.839	41.672	10.742	20.971
Raspoloživo za potrošnju	1.667.585	1.668.840	1.639.585	1.622.735	1.513.654	1.679.542

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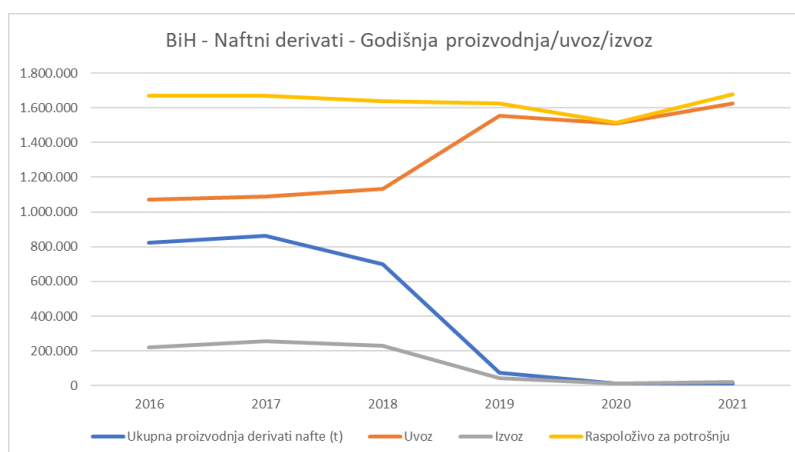


Figure 30 Annual production, import and export of petroleum products in BiH

4.3.1 The need for the construction of a new oil pipeline or supply route for BiH

At the time of writing, BiH has only one oil refinery located in Bosanski Brod. It is connected by pipeline to JANAF's oil pipeline in Croatia. JANAF delivers, if necessary, crude oil from the oil terminal in Omišalj on the island of Krk to the refinery in Bosanski Brod. The aforementioned refinery is in the territory of Republika Srpska. It is owned by a company from the Russian Federation and operates with great losses⁵⁸. Due to sanctions imposed on the Russian Federation for its aggression against Ukraine, which prohibit EU member states from buying oil, the refinery does not have access to crude oil. The Russian refinery has never been modernized and so it causes emissions of harmful gases that exceed the permissible levels. Air pollution in neighbouring Slavonski Brod leads to frequent population revolts.

JANAF can meet the crude oil needs of this refinery. The time of hydrocarbons, following the EU Commission's decision to decarbonise industry in the EU, is running out.

⁵⁸ Odluke_sa__26_redovne_godisnje_Skupstinieakcionara_RNB.pdf (rafinerija.com)

Because of all of the above, it is clear that there is no need to investigate the justification of the construction of the southern interconnection with a new oil pipeline to Croatia.

4.4 Connectivity of BiH with neighbouring countries for the purpose of coal and coke supply

BiH has its own lignite mines that are in exploitation. The main consumers of lignite are thermal power plants (TPP) in BiH. CO₂ emissions from these TPP are a source of continuous objections and pressures from the EU Commission to carry out the conversion of boilers in these TPP suitable for gas combustion. Citizens also use lignite for heating purposes.

4.4.1 Coal production and consumption in BiH

Most of BiH's coal needs are met from its own mines. The dominant consumer of coal is the industry. BiH imports smaller quantities of coal (high-calorie coal and coke) through the port of Ploče for the needs of the ironworks in Zenica. Lignite, anthracite and coke are transported by rail network to consumers. Rail transport is the dominant form of coal transport in BiH.

The following figures and tables show coal production and consumption in BiH.

Given the disruptions in the energy market caused by the Russian aggression against Ukraine, there is an increased demand for coal from the BiH mines, which leads to an increase in its exports.⁵⁹

⁵⁹ <https://www.poslovnih.hr/regija/sve-veca-potraznja-za-ugljenom-iz-bih-4332732>;
<https://www.slobodnaevropa.org/a/bosna-srbija-ugalj-rudnici/32012577.html>

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Table 23 Annual coal and coke balance sheet, BiH, 2021⁶⁰

	Kameni ugljen	Lignit	Mrki ugljen	Koks	
	<i>Hard Coal</i>	<i>Lignite</i>	<i>Brown Coal</i>	<i>Coke Oven Coke</i>	
	t	t	t	t	
Proizvodnja	–	6 767 736	6 063 748	960 865	Production
Uvoz	1 562 802	27 868	9 612	10 830	Import
Izvoz	7 564	7 804	153 035	446 096	Export
Saldo залиха	-47 077	133 217	385 792	-2 798	Stock changes
Potrošnja u energetskom sektoru	1 363 847	6 705 344	5 839 086	522 603	Consumption in energy sector
Ukupni gubici	–	–	–	–	Total losses
Finalna potrošnja	144 314	215 673	467 031	198	Final consumption
Industrija	144 314	26 355	254 093	198	Industry
Industrija željeza i čelika	40 764	–	13	–	<i>Iron and Steel</i>
Kemijska (uklj. i petrokemijsku)	33	–	182	4	<i>Chemical (incl. Petrochemical)</i>
Metali bez željeza	–	–	187 101	194	<i>Non-Ferrous Metals</i>
Nemetalni mineralni proizvodi	102 581	24 976	51 585	–	<i>Non-Metallic Minerals</i>
Transportna oprema	11	–	156	–	<i>Transport Equipment</i>
Strojevi	640	158	2 398	–	<i>Machinery</i>
Rudarstvo i kamenolomi	–	–	3 103	–	<i>Mining and Quarrying</i>
Prerada hrane, pića i duhana	57	528	4 400	–	<i>Food, Beverages and Tobacco</i>
Celuloza, papir i štampanje	10	–	175	–	<i>Paper, Pulp and Printing</i>
Drvo i drveni proizvodi	–	–	363	–	<i>Wood and Wood Products</i>
Tekstil i koža	218	687	3 394	–	<i>Textiles and Leather</i>
Nespecifirano (industrija)	–	6	1 223	–	<i>Non-specified (Industry)</i>
Građevinarstvo	–	50	–	–	Construction
Transport	–	–	–	–	Transport
Poljoprivreda	–	–	–	–	Agriculture
Kućanstva	–	161 468	87 696	–	Households
Ostali potrošači	–	27 800	125 242	–	Other

⁶⁰ https://bhas.gov.ba/data/Publikacije/Saopštenja/2022/ENE_04_2021_Y1_1_HR.pdf

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Table 24 BiH - Total consumption and production (t) - coal and coke

2017	Kameni ugalj (t)	Lignit (t)	Mrki ugalj (t)	Koks (t)	Ukupno (t)
Proizvodnja		7.698.496	6.385.213	855.036	14.938.745
Uvoz	1.361.422	24.921	73.568	57.916	1.517.827
Izvoz		11.112	227.506	305.686	544.304
Ukupno potrošnja (2017)	1.361.422	7.712.305	6.231.275	607.266	15.912.268
Potrošnja u energetsom sektoru (2017)	1.182.075	7.472.473	5.847.077	390.218	14.891.843
Udio potrošnje u energetsom sektoru	87%	97%	94%	64%	94%
2018	Kameni ugalj (t)	Lignit (t)	Mrki ugalj (t)	Koks (t)	Ukupno (t)
Proizvodnja		7.499.872	7.005.011	944.568	15.449.451
Uvoz	1.457.143	83.689	22.409	38.397	1.601.638
Izvoz	7	6.976	188.350	565.767	761.100
Ukupno potrošnja (2018)	1.457.136	7.576.585	6.839.070	417.198	16.289.989
Potrošnja u energetsom sektoru (2018)	1.318.991	7.048.051	6.379.766	428.875	15.175.683
Udio potrošnje u energetsom sektoru	91%	93%	93%	103%	93%
2019	Kameni ugalj (t)	Lignit (t)	Mrki ugalj (t)	Koks (t)	Ukupno (t)
Proizvodnja		6.971.178	6.405.472	907.098	14.283.748
Uvoz	1.531.177	29.285	87.237	46.070	1.693.769
Izvoz		5.252	157.920	454.673	617.845
Ukupno potrošnja (2019)	1.531.177	6.995.211	6.334.789	498.495	15.359.672
Potrošnja u energetsom sektoru (2019)	1.296.127	6.627.690	5.558.196	472.279	13.954.292
Udio potrošnje u energetsom sektoru	85%	95%	88%	95%	91%
2020	Kameni ugalj (t)	Lignit (t)	Mrki ugalj (t)	Koks (t)	Ukupno (t)
Proizvodnja		7.123.233	6.412.760	784.230	14.320.223
Uvoz	1.261.176	19.650	51.185	29.360	1.361.371
Izvoz	3	5.571	151.468	368.344	525.386
Ukupno potrošnja (2020)	1.261.173	7.137.312	6.312.477	445.246	15.156.208
Potrošnja u energetsom sektoru (2020)	1.147.966	7.027.048	6.070.533	459.247	14.704.794
Udio potrošnje u energetsom sektoru	91%	98%	96%	103%	97%
2021	Kameni ugalj (t)	Lignit (t)	Mrki ugalj (t)	Koks (t)	Ukupno (t)
Proizvodnja		6.767.736	6.063.748	960.865	13.792.349
Uvoz	1.562.802	27.868	9.612	10.830	1.611.112
Izvoz	7.564	7.804	153.035	446.096	614.499
Ukupno potrošnja (2021)	1.555.238	6.787.800	5.920.325	525.599	14.788.962
Potrošnja u energetsom sektoru (2021)	1.363.847	6.705.344	5.839.086	522.603	14.430.880
Udio potrošnje u energetsom sektoru	88%	99%	99%	99%	98%

5 ENERGY SYSTEM OF BOSNIA AND HERZEGOVINA

5.1 Competent institutions, capacities and development plans

5.1.1 Electrical energy

Among the institutions responsible for the production, distribution and management of electricity in BiH, the website of the Federal Ministry of Energy, Mining and Industry contains data, part of which we present below⁶¹.

5.1.1.1 Ministry of Industry, Energy and Mining of the Republika Srpska

On the website of the Ministry of Industry Energy and Mining of the Republika Srpska, data on the electricity balance for 2020, 2021⁶², 2022⁶³ and 2023⁶⁴ are available. Based on these data, we will show the movements in electricity production in the RS in the last three years (Table 25). Extremely dominant source of electricity in the RS are thermal power plants, but they also suffered the biggest drop in production in absolute amounts (GWh) in the period of

⁶¹ <https://fmeri.gov.ba/>

⁶² [https://www.vladars.net/sr-SP-](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/%d0%95%d0%bb%d0%b5%d0%ba%d1%82%d1%80%d0%be%d0%b5%d0%bd%d0%b5%d1%80%d0%b3%d0%b5%d1%82%d1%81%d0%ba%d0%b8%20%d0%b1%d0%b8%d0%bb%d0%b0%d0%bd%d1%81%202021.pdf)

[Cyrl/Vlada/Ministarstva/mper/std/Documents/%d0%95%d0%bb%d0%b5%d0%ba%d1%82%d1%80%d0%be%d0%b5%d0%bd%d0%b5%d1%80%d0%b3%d0%b5%d1%82%d1%81%d0%ba%d0%b8%20%d0%b1%d0%b8%d0%bb%d0%b0%d0%bd%d1%81%202021.pdf](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/%d0%95%d0%bb%d0%b5%d0%ba%d1%82%d1%80%d0%be%d0%b5%d0%bd%d0%b5%d1%80%d0%b3%d0%b5%d1%82%d1%81%d0%ba%d0%b8%20%d0%b1%d0%b8%d0%bb%d0%b0%d0%bd%d1%81%202021.pdf)

⁶³ [https://www.vladars.net/sr-SP-](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202022.g.pdf)

[Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202022.g.pdf](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202022.g.pdf)

⁶⁴ [https://www.vladars.net/sr-SP-](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202023.g.pdf)

[Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202023.g.pdf](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/Elektroenergetski%20bilans%20RS%202023.g.pdf)

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2020-2023, and the total balance sheet in 2023 is lower than the balance sheet in 2020 by about 560 GWh.

Table 25

<i>Electricity balance of the Republika Srpska 2020-2023</i>							
	EE balance sheet for 2020 [GWh]	EE balance sheet for 2021 [GWh]	EE balance index 2021/EE balance sheet 2020 [%]	EE balance sheet for 2022 [GWh]	EE balance index 2022/EE balance sheet 2021 [%]	EE balance sheet for 2023 [GWh]	EE balance index 2023/EE balance sheet 2022 [%]
Thermal power plants	5.200,00	4.960,00	95,00	5.197,80	105,00	4.695	90,30
Hydropower plants	2.352,67	2.333,71	99,00	2.343,42	100,00	2.332,49	99,50
SPP in the composition of ERS	76,18	76,23	100,00	73,84	97,00	72,61	98,30
SPP in the incentive system	332,89	349,25	105,00	365,80	105,00	68,60	18,80
SPP in free sale						236,91	
Industrial power plants	60,00	60,00	100,00	60,00	100,00	60,00	100,00
Other	6,38	2,63	41,00	6,00	228,00	3,65	60,10
Total	8.028,17	7.781,82	97,00	8.046,86	103,00	7.469,26	93,00

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In this short period, a slight decrease in the percentage of electricity produced in thermal power plants (TPP) can be observed compared to that produced in the other two types of power plants.

*Table 26 Planned electricity production in the RS by individual power plants
and types of power plants 2020–2023*

	2021	2022	2023
TPP Gacko	20,27%	19,39%	17,20%
TPP Ugljevik	20,79%	20,10%	19,87%
TPP Stanari	23,19%	25,10%	25,79%
HPP on Drina	11,98%	11,50%	12,18%
HPP on Vrbas	4,14%	3,96%	4,26%
HPP on Trebišnjica	14,11%	13,67%	14,78%
SPP in the composition of ERS	0,99%	0,92%	0,97%
SPP in the incentive system	4,52%	4,55%	0,92%*
SPP in free sale			3,17%
Industrial power plants		0,75%	0,80%
NP and SP		0,07%	0,05%

Data on the share of individual power plants in the planned electricity production will be presented and available ⁶⁵:

⁶⁵ Ibid

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* Production without SPP in the composition of "ERS", which are in the incentive system
Data on the percentage of electricity produced in the RS in different types of power plants ⁶⁶ are also available:

Table 27 Electricity production in RS by types of power plants 2020-2023

	2021	2022	2023
Thermal power plants	64,26%	64,59%	63,00%
Hydropower plants	30,23%	29,12%	31,00%
Small power plants	5,51%	6,28%	6,00%

It is clear that the decline in production in TPP Gacko (Eastern Herzegovina) plays the key role in a decline in production in thermal power plants, and to some extent in TPP Ugljevik (near Bijeljina), while in TPP Stanari (near Dobo) the production is growing. Production in hydropower plants and groups of hydropower plants, and in other types of power plants, which play a smaller role than TPP in the RS power system, was relatively stable in this period.

**5.1.1.2 State Electricity
Regulatory
Commission
(SERC)**

An overview map of the power system of Bosnia and Herzegovina with the operational areas of "Elektroprijenos BiH" and the areas of four electric utilities is available on the SERC website, as well as production capacities classified by types and transmission lines marked depending on the capacity

⁶⁶ Ibid (comparative data from the previous three links)

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and with interconnections to neighbouring countries, according to the data as of 31 December 2022.⁶⁷

Data on the balance sheets of the electricity sector of Bosnia and Herzegovina in 2022 in GWh, by distribution areas of electric utilities⁶⁸ are also available (Table 28).

⁶⁷ <https://www.derk.ba/ba/ees-bih/karta-ees>

⁶⁸ https://www.derk.ba/DocumentsPDFs/Osnovni_EES_pokazatelji_BiH_b.pdf

**ENERGY (IN)DEPENDENCE OF BOSNIA AND HERZEGOVINA AND STRATEGIC PARTNERSHIP WITH THE
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<i>Balance sheets of the electricity sector of BiH in 2022 in GWh by distribution areas of electric power utilities</i>						
	EP BiH	ERS	EP HZHB	Komunalno Brčko	Other entities	BiH
Production of hydroelectric power plants	1.125,62	1.978,29	1.296,81		57,83	4.458,55
Production of thermal power plants	4.544,09	2.957,13			2.128,21	9.629,43
Production of larger wind farms	121,16		154,64		114,59	390,39
Production of small and industrial power plants	58,33	40,53			458,73	557,59
Production in total	5.849,20	4.975,95	1.451,45		2.759,36	15.035,96
Distributive consumption	4.911,88	3.917,49	1.431,65	284,85		10.545,87
Transmission losses						333,03
Large customers	511,51	573,76	38,97			1.124,24
Own power consumption and pumping		14,68	35,03		4,79	54,50
Consumption total	5.423,39	4.505,93	1.505,65	284,85	4,79	12.057,64

It is interesting that EP BiH has the lowest production of hydropower plants, although it covers the territory with significantly more inhabitants than ERS and EP HZHB. EP HZHB, on the other hand, does not have a single thermal power plant, but it is the leader in the production of energy in wind power

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plants, which ERS does not have at all. EP BiH has 426 GWh higher production than consumption, ERS about 470 GWh, while in EP HZHB consumption is higher than production by about 54 GWh. Available data for the total installed capacity of larger hydropower plants and their generators in MW⁶⁹ will be presented in a tabular manner:

Table 29 Total installed capacity of larger hydropower plants in BiH and their generators in MW in 2022

Hydropower plants	Power of aggregate (MW)	Total installed capacity (MW)
Čapljina	2×210	420
Višegrad	3×105	315
Dubrovnik (BiH+CROATIA)	126+108	234
Salakovac	3×70	210
Jablanica	6×30	180
Trebinje I	2×54+63	171
Trebinje II	8	8
Rama	80+90	170
Grabovica	2×57	114
Bočac	2×55	110
Jajce I	2×30	60
Jajce II	3×10	30
Mostar	3×24	72
Mostarsko blato	2×30	60
Peć-Mlini	2×15.3	30,6

⁶⁹ Ibid

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According to available data⁷⁰, the total installed capacity of production facilities in Bosnia and Herzegovina is 4,632.62 MW, 2,076.6 MW of which in larger hydropower plants, 2,065 MW in thermal power plants, and 134.6 MW in larger wind power plants. The installed capacity of small hydropower plants is 181.89 MW, solar power plants 78.56 MW, biogas and biomass power plants 2.71 MW, small wind power plants 0.40 MW, while 92.85 MW is installed in industrial power plants.

It is noticeable that by far the largest part of hydropower plants in BiH is on the watercourses of the Adriatic Basin, for all three electric utilities, while on the watercourses of the Black Sea Basin the only major hydropower plants are Višegrad and Bočac (ERS) and Jajce I and Jajce II (EP HZHB).

Data on the installed and available power of the larger TPP are shown in Table 30⁷¹:

⁷⁰ <https://www.derk.ba/DocumentsPDFs/Osnovni-podaci-o-EE-sistemu-BiH-b.pdf>

⁷¹ Ibid

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*Table 30 Installed and available power of larger thermal power plants in BiH in
MW in 2022*

TPP		Installed power (MW)	Available power (MW)
TUZLA		715	635
	<i>Tuzla G3</i>	<i>100</i>	<i>85</i>
	<i>Tuzla G4</i>	<i>200</i>	<i>182</i>
	<i>Tuzla G5</i>	<i>200</i>	<i>180</i>
	<i>Tuzla G6</i>	<i>215</i>	<i>188</i>
KAKANJ		450	398
	<i>Kakanj G5</i>	<i>110</i>	<i>100</i>
	<i>Kakanj G6</i>	<i>110</i>	<i>90</i>
	<i>Kakanj G7</i>	<i>230</i>	<i>208</i>
GACKO		300	276
UGLJEVIK		300	279
STANARI		300	283

On the basis of the direct inquiry addressed by the IDPI to SERC with a request for information on current capacities and energy exchange with neighbouring countries, an official response containing the following information came:

- In the electricity transmission system of BiH there is no capacity for storing electricity (reversible power plant systems);

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- Despite the good connection of BiH with neighbouring power systems, a significant decrease in electricity exports occurred, in 2022 3,947 GWh was exported, which is 36.1% less than in the previous year;
- Electricity imports amounted to 868 GWh, it was decreased by 37.6% compared to the previous year.
- Among the 12 entities that carried out the import of electricity, the entities with the largest realization were Elektroprivreda Republike Srpske (204 GWh), Danske Commodities BH (132 GWh), GEN-I (95 GWh), etc.
- The largest volume of cross-border trade in electricity was carried out at the border with Montenegro, then at the borders with Serbia and Croatia.
- During 2022, the transit of electricity was registered through the transmission system of BiH in the amount of 3,397 GWh, which is a decrease of 243 GWh or 6.7% compared to 2021.

**5.1.1.3 Independent
System Operator
(ISO)**

On the official website of the Independent System Operators of BiH (ISO BiH) available data on ATC are available on a daily basis ⁷², and here, data for March 13, 2023, will be presented:

Exports from BiH to Serbia: 1,727 GWh

Imports to BiH from Serbia: 19,578 GWh

Exports from BiH to Croatia: 3,781 GWh

Imports to BiH from Croatia: 19,149 GWh

Exports from BiH to Montenegro: 3,887 GWh

Imports to BiH from Montenegro: 20.113 GWh

⁷² <https://www.nosbih.ba/hr/kapaciteti/atc/>

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It is noticeable that BiH has a foreign trade deficit in the exchange of electricity only with Serbia, but it has been reduced within five months, as well as the total volume of exchange with that country, because imports from Serbia have been reduced to a greater extent than exports to it. With Montenegro, the exchange remained the same, with the no deficits nor surpluses, as is the case in the exchange with Croatia, but exchange increased with Croatia, both exports and imports.

NTC data is also available on a monthly basis⁷³. The data for March and August 2023 are shown here (Table 31) .

*Table 31 Foreign trade balance of BiH in the exchange of electricity with
neighbouring countries in March and August 2023*

	March 2023	August 2023
Export from BiH to Serbia	12.900	12.400
Imports to BiH from Serbia	16.500	14.700
Balance sheet with Serbia	-3.600	-2.300
Export from BiH to Croatia	15.750	17.300
Imports to BiH from Croatia	15.750	17.300
Balance sheet with Croatia	0	0
Export from BiH to Montenegro	15.500	15.500
Import to BiH from Montenegro	15.500	15.500
Balance sheet with Montenegro	0	0
Total exports from BiH	44.150	45.200
Total imports to BiH	47.750	47.500
Balance Total	-3.600	-2.300

On the pages of ISO BiH one can also find data on planned stoppages on interconnective lines for 2023⁷⁴:

⁷³ <https://www.nosbih.ba/hr/kapaciteti/ntc/>

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Table 32 Planned stoppages on interconnective lines of BiH with neighbouring countries for 2023

Interconnective line	Voltage level (kV)	Beginning	The end
Ugljevik – S. Mitrovica (RS)	400	26.07.	28.07.
Višegrad – Požega (RS)	220	19.06.	21.06.
Trebinje – Lastva (MNE)	400	20.03.	24.03.
Trebinje – HPP Perućica (MNE)	220	12.06.	16.06.
		04.09.	08.09.
Sarajevo 10 – HPP Piva (MNE)	220	25.09.	29.09.
Ugljevik – Ernestinovo (HR)	400	10.05.	11.05.
Mostar 4 – Konjsko (HR)	400	06.03.	10.03.
Mostar 4 – Zakućac (HR)	220	27.03.	31.03.
Tuzla – Đakovo (HR)	220	03.04.	14.04.
		24.05.	25.05.
Gradačac – Đakovo (HR)	220	26.04.	27.04.
		22.05.	23.05.
Trebinje – Plat (HR)	220	16.10.	17.10.
Prijedor 2 – Međurić (HR)	220	10.05.	12.05.
Prijedor 2 – Sisak (HR)	220	15.05.	19.05.

⁷⁴ <https://www.nosbih.ba/hr/ees/planirani-zastoji/>

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The planned stoppages for 2023 generally do not exceed 4 days of transmission interruption, except in the case of the Tuzla – Đakovo transmission line in April.

Dynamic maps with data on the current and planned total cross-border exchange of BiH on a daily basis ⁷⁵, and on the flow of electricity on cross-border transmission lines in MW and MVar ⁷⁶. are also available on the pages of the ISO BiH. Based on a direct inquiry sent by IDPI to the ISO BiH with a request for information on current capacities and energy exchange with neighbouring countries, an official response came, containing the following information:

„According to the current methodology of transmission capacity calculation, the maximum calculated transmission capacities at the borders, in both directions, are:

NTC BA-HR 1000 MW

NTC BA-ME 500 MW

NTC BA-RS 600 MW

As for the utilization of cross-border transmission capacity, it is difficult to provide an answer. Exchange with neighbouring transmission systems, in addition to exports / imports from BiH, largely has transit flows that change in daily activities, from east to west and vice versa, so the actual flows often do not reflect the figure of the planned flows. On several occasions, due to overload and congestion, further transactions, exchanges on the border with Croatia and Montenegro were suspended, although there was an ATC available“.

⁷⁵ <https://www.nosbih.ba/hr/ees/fizicki-tokovi/>

⁷⁶ <https://www.nosbih.ba/hr/ees/ace/>

**5.1.1.4 Regulatory
Commission for
Energy of the
Republika
Srpska (RERS)**

On the RERS website, one can find a register of permits for the electricity production in the Republika Srpska⁷⁷. The permits are held by 29 entities, with the following arrangement in the territory of the entities:

Table 33 Permits for electricity production in the RS

Mesoregion	Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Prijedor	/	0	0	0
Banja Luka	Banja Luka	7	9	62
	Šipovo	1	1	10
	Laktaši	1	1	5
	Mrkonjić Grad	1	1	4
	Total	10	12	81
Doboj	Teslić	3	3	19
	Stanari	1	1	10
	Total	4	4	29
Bijeljina	Ugljevik	1	1	7
	Zvornik	1	1	7
	Srebrenica	1	1	5
	Total	3	3	19
Istočno Sarajevo	Pale	2	2	17
	Rogatica	1	2	17
	Višegrad	1	1	12
	Total	4	5	49
Trebinje	Trebinje	3	3	27
	Foča	1	1	12
	Gacko	1	1	7
	Total	5	5	46
Total RS		26	29	224

⁷⁷ <https://reers.ba/registar-dozvola/elektricna-energija/?pismo=lat>

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In the Register of permits for electricity distribution activities there are 5 entities, one from each mesoregion except Prijedor, whereby entities from Doboj and Bijeljina have permits validity of 10 years and the rest of 5. In the Register of permits for performing electricity supply and trading activities there are 8 entities – 3 from Banja Luka with a total validity of permits of 4 years, from mesoregion Trebinje 3 entities with a total validity of permits of 11 years, and from mesoregion Doboj 2 entities with a total validity of permits of 6 years.

**5.1.1.5 Regulatory
Commission for
Energy in FBiH
(FERK)**

On the official website of FERK, data on operating licences for entities qualified for electricity production⁷⁸ are available. These data will be presented here, first at the level of the entire Federation of BiH by cantons/ counties, and then at the level of each of them by local self-government units.

⁷⁸ https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/19549-dozvole-za-rad-za-proizvodnju-el-energije-kvalifikovani

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Table 34 Permits for electricity production in FBiH

Canton/ county	Number of Entities	Number of permits	Total validity of permits in years
Herzegovina- Neretva County	109	199	2.019
Zenica-Doboj Canton	104	145	1.579
West Herzegovina County	41	135	1.406
Central Bosnia County /Central Bosnia Canton	45	72	741
Sarajevo Canton	32	55	482
Tuzla Canton	29	40	389
Una-Sana Canton	11	39	439
Hercegbosna County	5	6	61
Posavina County	3	3	30
Bosnia-Podrinje Canton	1	1	10
Federation of BiH	380	695	7.156

Disproportions among cantons/counties are clear, given that more than two-thirds of permits in the FBiH (68.92%) were issued in three out of ten counties (Herzegovina-Neretva County, Zenica-Doboj Canton, West Herzegovina County).

Distinct disproportions among cantons/counties can also be identified within them, between different local self-government units.

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Table 35 Permits for electricity production in Herzegovina-Neretva County

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Mostar	27	65	641
Čapljina	23	46	484
Prozor-Rama	33	40	416
Čitluk	11	16	173
Jablanica	4	15	154
Stolac	8	13	109
Konjic	2	3	30
Neum	1	1	12
Herzegovina-Neretva County	109	199	2.019

Mostar, Čapljina and Prozor-Rama have more than three quarters of the permits (75.88%) issued in Herzegovina-Neretva County.

Table 36 Permits for electricity production in Zenica-Doboj Canton

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Tešanj	61	83	908
Zenica	10	18	194
Usora	5	12	124
Kakanj	6	9	102
Maglaj	6	7	82
Visoko	7	7	77
Žepče	4	4	44
Doboj-Jug	2	2	22
Breza	2	2	14
Zavidovići	1	1	12
Zenica-Doboj Canton	104	145	1.579

Disproportions are most evident in Zenica-Doboj Canton, since 57.24% of permits were issued in the Municipality of Tešanj.

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Table 37 Permits for electricity production in West Herzegovina County

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Grude	10	58	584
Široki Brijeg	14	43	438
Posušje	15	31	348
Ljubuški	2	3	36
West Herzegovina County	41	135	1.406

With the exception of the highly underrepresented City of Ljubuški, in the West Herzegovina County disproportions among local self-government units are not so pronounced, since 42.96% of permits were issued in Grude, 31.85% in Široki Brijeg, and 22.96% in Posušje.

Table 38 Permits for electricity production in Central Bosnia County /Central Bosnia Canton

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Gornji Vakuf-Uskoplje	10	16	166
Busovača	6	11	128
Travnik	7	11	108
Jajce	4	9	96
Kiseljak	4	9	90
Fojnica	4	5	50
Vitez	4	4	32
Bugojno	2	3	30
Novi Travnik	2	2	22
Donji Vakuf	2	2	19
Central Bosnia County /Central Bosnia Canton	45	72	741

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In the Central Bosnia County/Central Bosnia Canton, disproportions are also not significantly expressed, with a slight advantage of Gornji Vakuf – Uskoplje, Travnik and Busovača.

Table 39 Permits for electricity production in Sarajevo Canton

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Sarajevo (municipalities of the city center)	22	38	315
Vogošća	5	12	117
Ilidža	2	2	20
Hadžići	2	2	20
Ilijaš	1	1	10
Sarajevo Canton	32	55	482

The disproportions are expectedly large in the Sarajevo Canton, given that 69.09% of permits have been issued in the municipalities of the city core of the City of Sarajevo.

Table 40 Permits for electricity production in Tuzla Canton

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Tuzla	8	10	106
Živinice	5	6	68
Kalesija	4	6	60
Gradačac	3	5	52
Doboj Istok	4	5	47
Gračanica	2	5	26
Srebrenik	2	2	20
Lukavac	1	1	10
Tuzla Canton	29	40	389

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In Tuzla Canton, the distribution of permits by cities and municipalities is relatively even, with a mild concentration in the City of Tuzla (25% of permits in the Canton).

Table 41 Permits for electricity production in Una-Sana Canton

Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Bosanski Petrovac	3	24	274
Bihać	5	12	135
Sanski Most	1	1	10
Cazin	2	2	20
Una-Sana Canton	11	39	439

In the Una-Sana Canton, the Municipality of Bosanski Petrovac strongly dominates in terms of the number of permits with 61.54% of permits.

Table 42 Permits for electricity production, aggregate data for Hercegbosna County, Posavina County and Bosnian-Podrinje Canton

Canton/County	Local Self-Government Unit	Number of Entities	Number of permits	Total validity of permits in years
Hercegbosna County	Tomislavgrad	3	4	39
	Livno	2	2	22
	Total	5	6	61
Posavina County	Orašje	2	2	20
	Domaljevac-Šamac	1	1	10
	Total	3	3	30
Bosnian-Podrinje Canton	Foča (FBiH)	1	1	10
	Total	1	1	10
Total for 3 counties/cantons		9	10	101

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In three counties/cantons where the activity of electricity production is practically negligible, only municipality that slightly stands out with the number of permits issued is the Municipality of Tomislavgrad.

In the Federation of BiH, the license for operators is held only by the Operator for Renewable Energy Sources and Efficient Cogeneration (Operator for OIEiEK) from Mostar ⁷⁹, while the license for the production of electricity for its own needs is held by the Public Institution Centre for Children and Youth with Special Needs "LOS ROSALES" from Mostar ⁸⁰.

First order of electricity supply permits are held only by JP Elektroprivreda HZ HB from Mostar and JP Elektroprivreda BiH d.d. – Sarajevo, both with a period of validity 01.01.2022. – 31.12.2026⁸¹. Second order permits are held by 9 entities from Sarajevo (DISAM BH d.o.o., GEN-I d.o.o., Alpiq Energija BH d.o.o., Danske Commodities BH d.o.o., PETROL BH OIL COMPANY" d.o.o., JP Elektroprivreda BiH d.d., ASA Energija d.o.o., Interenergo d.o.o. and HSE BH d.o.o.), 4 entities from Herzegovina-Neretva County (PLAVO SUNCE d.o.o. from Čitluk, JP "Elektroprivreda HZ HB, Axpo BH d.o.o. and HEP Energija d.o.o. from Mostar), three entities from West Herzegovina County (GP TOMING d.o.o. from Grude, GET - TZE d.o.o. and VIBAR d.o.o. from Široki Brijeg), as well as one entity each from Central Bosnia Canton/Central Bosnia County (ECO-KW d.o.o. from Kiseljak), Tuzla Canton (GLOBAL ISPAT KIL d.o.o. from Lukavac), Zenica-Doboj Canton (HIFA-OIL d.o.o. from Tešanj) and Hercegbosna County (Winter Wind d.o.o. from Tomislavgrad)⁸². JP Elektroprivreda Bosne i

⁷⁹ https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/18741-licence-za-operatore

⁸⁰ https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/18377-dozvole-za-proizvodnju-elektricne-energije-za-vlastite-potrebe

⁸¹ https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/18374-dozvole-za-snabdijevanje-el-energijom-i-reda

⁸² https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/18375-dozvole-za-snabdijevanje-el-energijom-ii-reda

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Hercegovine d.d. – Sarajevo, and JP Elektroprivreda Hrvatske zajednice Herceg Bosne d.d.⁸³ hold permits for distribution of electricity.

**5.1.1.6 Elektroprivreda
RS**

Table 43 Coal reserves in RS in thousands of tons (M – brown coal, L – lignite)

Name of production capacity and type of coal	Total geological reserves	Exploitation reserves
Ugljevik mine (M)	265.201	206.507
Stanari mine (L)	126.823	73.271
Gacko mine (L)	307.320	245.662
Miljevina mine – near Foča (M)	77.100	19.080
Kotor Varoš (M)		
Lješljani – near Bosanski Novi (M)		
Ramići – near Banja Luka (L)	37.596	33.836,4
Total lignite RS	471.739	352.769
Total brown coal RS	342.301	225.587
Total RS	814.040	578.356

Data on coal reserves in Republika Srpska in thousands of tons are available on the website of Elektroprivreda RS⁸⁴ (Table 43).

⁸³ https://www.ferk.ba/_hr/index.php/dozvole/registar-dozvola/elektricna-energija/18373-dozvole-za-distribuciju-elektricne-energije

It is also highlighted that the mines of Kotor Varoš, Lješljani and Ramići have been explored and coal reserves have been proven, but there is currently no exploitation in them.

**5.1.1.7 Elektroprivreda
Hrvatske
zajednice Herceg
Bosne**

Within the company "Production of electricity" there are sectors Hydroelectric power plants – basin Vrbas (plants "HPP Jajce I" and "HPP Jajce II) and Hydroelectric power plants – Neretva basin (plants "HPP Rama Prozor", "HPP Mostar", "HPP Peć Mlini" near Grude and "HPP Mostarsko Blato" near Mostar, and independent plant "CHE Čapljina"⁸⁵.

Within the company "Electricity Distribution" there are data on the area in which the activity is carried out ⁸⁶, which includes: Distribution area "South" (Čapljina, Čitluk, Stolac, Neum, Ravno and Rama, and parts of the City of Mostar and Doljani from the Municipality of Jablanica from Herzegovina-Neretva County, all 4 municipalities from West Herzegovina County, and all 6 municipalities from Hercegbosna County), Distribution Area "Centre" (Novi Travnik, Busovača, Vitez, Uskoplje, Jajce, Dobretići, Kiseljak and Kreševo, and Nova Bila from the Municipality of Travnik and Gojevići from the Municipality of Fojnica, as well as Usora, Vareš, Žepče and Novi Šeher from the Municipality of Maglaj), and the Distribution Area "North" (all 3 municipalities from Posavina County). These distribution areas are analogous to supply areas and their branches⁸⁷.

⁸⁴ <https://ers.ba/termoenergetski-potencijal/>

⁸⁵ <https://www.ephzhh.ba/organizacija/proizvodnja-elektricne-energije/>

⁸⁶ https://www.ephzhh.ba/organizacija/org_distr/

⁸⁷ <https://www.ephzhh.ba/organizacija/opskrba/>

**5.1.1.8 Elektroprivreda
BiH**

On the website of Elektroprivreda BiH one can find information about its production capacities. It owns two thermal power plants, TPP Tuzla with an installed capacity of 740 MW and a projected annual electricity production of 2,316.30 GWh, and TPP Kakanj with an installed capacity of 450 MW and a projected annual electricity production of 2,003,157 GWh.⁸⁸ Data on hydropower plants on the Neretva river are shown in Table 44⁸⁹:

Table 44 Hydroelectric power plants in the possession of Elektroprivreda BiH

	Installed power	Maximum net drop	Type of turbines	Average annual production⁹⁰
HPP Jablanica	196.98 MW (6 x 32.83 MW)	111.0 m	Francis	693 GWh
HPP Grabovica	117 MW (2 x 58.5 MW)	36.0 m	Kaplan	260.4 GWh
HPP Salakovac	208.50 MW (3 x 69.5 MW)	45.0 m	Kaplan	356.6 GWh
Total	522.48 MW	/	/	1,310 GWh

Data on 7 small hydropower plants are also available, which are managed through 3 departments⁹¹:

⁸⁸ <https://www.epbih.ba/stranica/termoelektrane>

⁸⁹ <https://www.epbih.ba/stranica/hidroelektrane-na-neretvi>

⁹⁰ Based on 70% probability of inflow from the current hydrological sequence (1989-2018)

⁹¹ <https://www.epbih.ba/stranica/male-hidro>

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Table 45 Small hydroelectric power plants owned by Elektroprivreda BiH

Department	Power plant	Installed power
Bihać department	MHPP "Una Kostela" - Bihać	10,136 MW (4 x 2,534 kW)
	MHPP "Krušnica" - Bosanska Krupa	0.46 MW (2 x 230 kW)
	MHPP "Bihać" - Bihać,	0.16 MW (1 x 160 kW)
Tuzla department	MHPP "Modrac" - Lukavac	1,898 MW (1 x 1,898 kW)
	MHPP "Sniježnica" - Teočak	0.422 MW (275kW+147kW)
Sarajevo department	MHPP "Osanica" - Goražde	1,084 MW (2 x 542 kW)
	MHPP "Bogatići" – Trnovo	EPBIH owns a dam with accumulation
Total		14.16 MW

In addition, the WIND FARM "Podveležje 1" is owned by EP BiH, with an installed capacity of 48 MW and a projected annual production of 120 GWh, consisting of 15 production units/wind turbines whose individual installed capacity is 3.2 MW.

The activity of electricity distribution is organized into six distribution parts as shown in Table 46⁹²:

⁹² <https://www.epbih.ba/stranica/podruznice#distribucije>

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*Table 46 Structure of distribution activities and number of consumers of
Elektroprivreda BiH*

Electricity distribution	Approximate number of consumers	Offices
Bihać	108.000	Bihać, Bosanska Krupa, Cazin, Velika Kladuša, Bužim, Bosanski Petrovac, Ključ, Sanski Most
Mostar	42.000	Jablanica, Konjic, Mostar
Sarajevo	242.000	Stari Grad, Centar, Novo Sarajevo, Novi Grad, Ilidža, Vogošća, Hadžići, Ilijaš, Goražde
Travnik	61.000	Travnik, Bugojno, Donji Vakuf-Jajce, Gornji Vakuf-Uskoplje, Novi Travnik, Fojnica, Busovača-Kiseljak, Vitez
Tuzla	206.000	Banovići, Čelić, Doboj istok, Gračanica, Gradačac, Kalesija, Kladanj, Lukavac, Srebrenik, Sapna, Tuzla, Teočak, Živinice
Zenica	144.000	ED Zenica includes branch offices: Breza, Doboj, Kakanj, Maglaj, Olovo, Tešanj, Vareš, Visoko, Zavidovići, Zenica, Žepče
Total	803.000	

Production in GWh in the years from 2011 to 2021 is shown in Table 47:

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Table 47 Production of Elektroprivreda BiH 2011 – 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	7.295	6.509	7.473	7.404	6.910	7.245	7.009	7.245	6.034	6.238	6.677
TPP	6.138	5.368	5.550	5.787	5.413	5.780	6.007	5.648	4.527	5.156	4.841
HPP	1.157	1.141	1.924	1.617	1.496	1.464	1.002	1.597	1.506	1.082	1.729
Wind farm Podveležje											107
Share of HPP and wind farm	16%	18%	26%	22%	22%	20%	14%	22%	25%	17%	27,5%

Table 48 shows available data of the electricity balance in GWh for the years 2017-2021.⁹³:

⁹³ <https://www.epbih.ba/stranica/o-kompaniji#elektroenergetski-bilans-drustva>

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*Table 48 Realization of the electricity balance of Elektroprivreda BiH in GWh
2017-2021 (** under the jurisdiction of the ISO)*

	2017	2018	2019	2020	2021	Change
Hydropower plants	1.002	1.597	1.506	1.082	1.729	59,8%
HPP on Neretva	941	1.534	1.444	1.024	1.665	62,6%
Small HPP	60	64	63	58	64	9,6%
Wind farm Podveležje					107	**
Thermal power plants	6.007	5.648	4.527	5.156	4.841	-6,1%
TPP Tuzla	3.461	3.196	2.759	3.124	2.863	-8,4%
TPP Kakanj	2.547	2.452	1.768	2.032	1.978	-2,6%
Production	7.009	7.245	6.034	6.238	6.677	7,0%
Reception	2.739	991	1.556	1.403	1.182	-15,8%
Available	9.748	8.237	7.590	7.641	7.859	2,9%
Gross distribution consumption	4.730	4.706	4.739	4.678	4.862	3,9%
Direct consumers	485	464	493	561	550	-1,9%
Transmission losses	**	**	**	**	**	**
Total consumption	5.113	5.090	5.182	5.196	5.380	3,5%
Delivery	4.635	3.147	2.408	2.445	2.479	1,4%
Total needs	9.748	8.237	7.590	7.641	7.859	2,9%

EP BiH's development plans are aimed at building new replacement thermal blocks that meet the criteria of high-efficiency cogeneration, emission limit values and energy efficiency, and the construction of new renewable sources power plants (hydropower plants, wind farms and photovoltaic plants). In accordance with the Long-Term Development Plan of EPBiH, the decisions of the Government of the FBiH and the competent institutions on the proclamation of public interest and the preparation of the construction of new power facilities, EPBiH intensively prepares capital projects for the construction of new production facilities⁹⁴.

The strategic and priority goals of EPBiH are the construction of Block 7 in TPP "Tuzla" and Block 8 in TPP "Kakanj", replacement facilities for existing blocks

⁹⁴ <https://www.epbih.ba/stranica/kapitalne-investicije>

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that must be shut down due to their expiration and restrictions imposed by the EU regulations for the operation of thermal power plants after 2017. The construction of these facilities ensures safe placement of coal and the survival of mines, but they also aim at a continuous increase in production capacities based on renewable sources. The following capital projects are the priority objectives of EPBiH in the coming period (as shown in Table 49).

Table 49 Planned investments of Elektroprivreda BiH

	Location	Object type	Installed power	Annual production	The value of the investment
Block 7 TPP Tuzla ⁹⁵	Existing TPP Tuzla	Replace-ment cogene-ration block on lignite	450 MW + 270 MW of thermal energy	2,756 GWh	1,812 million BAM
HPP Janjići ⁹⁶	Bosna River, Zenica	Flow-through	15.75 MW	77.26 GWh	109.8 million

⁹⁵ Completed activities: Decision on public interest for construction, completed and revised investment-technical and environmental documentation, completed the procedure of selection of the project partner and closure of the financing structure, signed EPC Contract for construction, signed agreement on credit line for financing construction, decision on construction after obtaining approval to sign contracts by the Government and Parliament of the FBiH, completed preparatory works on the site, Signed contract on connection to the EES BiH with Elektroprijenos BiH, realized projects from the Friendly Environment Program with the City of Tuzla, obtained water approval (Agency for the Sava River Basin), environmental permit (Federal Ministry of Environment and Tourism), certificate of connection to the EES (ISO BiH), urban approval and general approval for construction (Federal Ministry of Physical Planning), Conditions for connection to the 400kV transmission network (Elektroprijenos BiH), and Energy Permit (Federal Ministry of Industry, Energy and Mining); Activities in progress: resolving property and legal relations, hiring the chief engineer, relocation of the 220kV DV from the Tuzla TPP circle; Upcoming activities: securing the remaining and extending of obtained permits and approvals, preparation of basic, main and detailed design, delivery of equipment, installation, testing and commissioning.

⁹⁶ Activities completed: Feasibility Study - Fichtner (Germany), Electroforce (BiH) and ERM (Germany), December 2012, preliminary design - Energoinvest Sarajevo, December 2015, Zero State of Flora and Fauna Study and Environmental Impact Assessment Studies - Consortium Oikon Zagreb, Geonatura Zagreb and HEIS Institute of Hydrotechnics d.d. Sarajevo, January 2016, environmental permit, general approval for construction, connection

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		collectible power plant			BAM
HPP Ustikolina⁹⁷	Drina River, BPK	Flow- through collectible power plant	60.48 MW	236.80 GWh	270 million BAM
HPP Kovanići⁹⁸	Bosna River, ZDK	Flow- through collectible power plant	12.2 MW	58.5 GWh	89.16 million BAM
HPP Vranduk⁹⁹	Bosna River, Zenica	Flow- through derived power plant	19.63 MW	102 GWh	142.9 million BAM
HPP Una Kostela¹⁰⁰	Una River, existing HPP,	Flow- through	13.7 MW	73.5 GWh	32.7 million

conditions based on the Study of technical design of connection to the transmission network; Activities in progress: resolution of property and legal relations, preparation of a public call for the selection of the designer of the Main Road Design and road contractors, public call for execution of design works, delivery of equipment, construction and commissioning on a turnkey basis; Upcoming activities: obtaining approvals for road construction, design and construction.

⁹⁷ Completed activities: Preliminary design I Phase without investigation works, environmental permit; Activities in progress: Obtaining authorisation to carry out investigative works; Upcoming activities: Selection of contractors and execution of investigation works, innovation of preliminary design

⁹⁸ Completed activities: Feasibility study with geological exploration works, Feasibility Study and request for concession award, Preliminary design, Decision on declaring public interest, accession to the preparation of the construction of power facilities, selection of strategic partners and accession to the award of concessions; Activities in progress: preparation of an Environmental Impact Study; Upcoming activities: obtaining a construction concession and a decision on urban approval for construction.

⁹⁹ Completed activities: Preliminary design - Energoinvest d.d. Sarajevo, IPSA Institute Sarajevo and POYRY Energy GmbH Wien, 2010, concession contract signed; Activities in progress:

Renewal of permits and approvals for construction; Upcoming activities: Publication of a public call for the selection of contractors for construction.

¹⁰⁰ Completed activities: Analysis of hydraulic characteristics and energy effects of the second phase of reconstruction with preliminary design, Study with exploration works on environmentally friendly flow, Preliminary design of reconstruction and extension,

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	Bihać	derived power plant			BAM
Block 8 TPP Kakanj¹⁰¹	Existing-TPP Kakanj	Replace- ment cogene- ration block	300 MW + 300 MW of heat energy	1,755 GWh	1,035 million BAM
Photovoltaic power plant Gračanica 1 and 2	RU Grača- nica, Municipality of Bugojno	Photovol- taic power plants	44 MW	68 GWh	
Photovoltaic power plant Gornja Breza	RMU Breza, Municipality of Breza	Photovol- taic power plant	15 MW	21.9 GWh	
Photovoltaic power plants Podveležje 1 and Podveležje 2	Donje Podveležje plateau, Mostar	Photovol- taic power plant	43 MW	71,3 GWh	

Environmental impact study and society of reconstruction and expansion projects, Environmental permit; Activities in progress: obtaining approval for reconstruction and expansion.

¹⁰¹ Completed activities: Decision on public interest for construction, completed and revised investment-technical and environmental documentation, realized projects from the Friendly Environment Program with the Municipality of Kakanj, completed innovating the preliminary design with an increase in power to 350 MW, obtained Water approval (Sava River Basin Agency), Environmental permit (Federal Ministry of Environment and Tourism), Certificate of connection to the EES (ISO BiH), Urban approval and General approval for construction (Federal Ministry of Physical Planning), Conditions for connection to the 400kV transmission network (Elektroprijenos BiH); Activities in progress: establishing the draft and proposal of the Decision on the basic principles, criteria and methodology of the selection of the project partner for the realization of the project, preparation of tender documentation for the selection of the project partner; Upcoming activities: obtaining new permits and approvals in accordance with the increased strength of the block, choosing a project partner and closing the financing structure, contracting construction, carrying out preparatory works on the site, making a Construction Decision.

5.1.2 Gas

As in the case of electricity, there are no complete data on gas capacities on the website **of the Federal Ministry of Energy, Mining and Industry**. There is neither a regulator at the state level, nor a federal regulatory agency. In addition, on the available website of the company GAS-RES from Banja Luka one can only find an information that it is an energy company based in Banja Luka, with activities in the field of trade and supply of natural gas.

5.1.2.1 Ministry of Industry, Energy and Mining of the Republika Srpska

On the website of the Ministry of Industry, Energy and Mining of the RS one can find the document "Energy Development Strategy of the Republika Srpska until 2035". It contains data on the structure of the gas market not only in the RS, but throughout BiH. The entire supply of gas to the RS is based exclusively on imports from a single source and one gas pipeline, from Russia through Ukraine, Hungary and Serbia, which enters BiH north of Zvornik, and enters the territory of the Federation of BiH near Kladanj and extends to Sarajevo. The gas pipeline is jointly owned by "Gas Promet" a.d. Istočno Sarajevo – Pale (22 km from the border with Serbia to Zvornik), and "Sarajevo-gas" d.o.o. Lukavica (40 km between Zvornik and Kladanj). The total length of the gas pipeline is 62 km, the cross section is 406.4 mm, the designed pressure is 50 bar, and the designed capacity is 1 billion m³ per year. "Gas Promet" a.d. Istočno Sarajevo – Pale has the license for operating the system, and "Gas Promet" Istočno Sarajevo – Pale and "Sarajevo-gas", a.d. Istočno Sarajevo for the transport of gas. The following companies from the Republika Srpska are

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actively operating on the wholesale market: Gas Res¹⁰², Sarajevo-gas Istočno Sarajevo¹⁰³, Zvornik stan¹⁰⁴, Bijeljina-gas, CNG Energy i Energy Prime RS.

Table 50 Structure of the gas market in Bosnia and Herzegovina and Republika Srpska, 2014 and 2015¹⁰⁵

Wholesale	BH Gas (Energoinvest)	Gas Res	Alumina
Transport	BH Gas	Gas Promet Istočno Sarajevo Pale	Sarajevo - gas Istočno Sarajevo
Distribution and/or supply	Sarajevo-gas Sarajevo Visoko Ekoenergija	Zvornik Stan Bijeljina-gas CNC Energy	Sarajevo - gas Istočno Sarajevo Energy Prime RS

BH Gas performed transport of 76% of natural gas in 2014 and 2015 on the market of BiH, Gas Promet Istočno Sarajevo Pale 8% and Sarajevo - gas Istočno Sarajevo 16%. BH Gas and Gas Res supplied 80% of gas to customers in BiH combined, with industrial entities buying 29% of their gas, and households and others 71%. Alumina supplied 20% of gas to customers in BiH, and 88% of its gas was purchased by industrial entities, 4% by heating plant in Zvornik, and 8% by households and commercial customers.

¹⁰² The company for gas projects established by the Government of the Republika Srpska by the Decision according to the Law on Public Enterprises (Article 2) and the Law on Companies (Art. 7 and 101), which signed a contract with Gazprom on the supply of Gas to the Republika Srpska.

¹⁰³ In addition to transport, it performs distribution and supply activities, which is not in accordance with the Third Energy Package, but with a note of the possibility of exemption because it has less than 100,000 customers.

¹⁰⁴ Integrated distribution and supply operator in the municipality of Zvornik, which also has a heating plant in the city of Zvornik, with realized consumption of 2.5 million m³ in 2015 and 2.6 million m³ in 2016.

¹⁰⁵ Source: RERS Activity Report 2015, "BH-Gas", Federal Bureau of Statistics – natural gas balance 2015, Energy Planning Balance of the Republika Srpska for 2016; Note: 1) Refers to the market share of the coverage of the gas pipeline network for transport; 2) It refers to the total gas consumption for 2015.

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In terms of consumption, the share of The Republika Srpska in the total gas consumption in the territory of Bosnia and Herzegovina amounted to about 20% in 2015, 88% of which was intended for industry (primarily "Alumina"), while the share of gas consumption for 2016 was 27.6% in the Republika Srpska.

In the period from 2010 to 2016, gas consumption in the RS amounted to about 24 to 70 million m³ per year, with great unpredictability of demand of industrial customers who had the largest share in total consumption of around 80% to 90% in the observed period. Gas consumption in RS households amounted to 2-2.3 million m³ per year, with a slight downward trend of an average -1.4% per year. There is a noticeable trend of growth in households after 2017, given the gasification of the city of Bijeljina. Other categories of customers (heating plants and other consumers) recorded a declining trend within the period from 2010 to 2016. Looking at the absolute level, the mentioned changes are not significant if observed at the level of total gas consumption.

The primary development goal for the Republika Srpska is to connect to the gas pipeline system of Serbia through the new interconnection, and the construction of the main gas pipeline towards Banja Luka (and further towards the border with the Republic of Croatia). Due to geopolitical turbulence, the statuses of individual projects have changed. Thus, South Stream was cancelled in 2014, with subsequent unsuccessful negotiations on the continuation of construction. Along with the before mentioned, the most important routes for the Republika Srpska are the Adriatic-Ionian Gas Pipeline (IAP) and the LNG regasification terminal in Croatia as cross-border projects relevant for BiH, and potentially for the RS but with a lower focus on development. The IAP project, as a planned branch of the Trans-Adriatic Pipeline (TAP), represents a very promising option of gasification of Albania, Montenegro, Croatia, and Bosnia and Herzegovina (dominantly FBiH). Possible interconnections with Croatia are viewed by RS as two-way, not exclusively meant for import into Republika Srpska.

**5.1.2.2 Regulatory
Commission for
Energy of the
Republika
Srpska (RERS)**

RERS is a specialized, autonomous and independent non-profit organization. The task of the Regulatory Commission is to ensure the conditions for opening the market for free competition in activities that are not inherently monopolistic in nature, while ensuring equal access of all parties to monopolistic activities, quality of services and fair price with profitable business of participants, while respecting generally accepted international standards¹⁰⁶.

According to the decisions of RERS ¹⁰⁷, permits for performing the activities of distribution and management of the distribution system of natural gas hold "Sarajevo-gas" a.d. Istočno Sarajevo (from 31.07.2014., validity period 10 years) and A.D. "Zvornik stan" (from 31.07.2019., validity period 15 years), and for the activity of trade and supply of natural gas "Sarajevo-gas" a.d. Istočno Sarajevo (from 31.07.2014., 10 years), A.D. "Zvornik stan" (from 31.07.2019., 5 years), GAS-RES d.o.o. Banja Luka (from 26.02.2014., 10 years), D.o.o. "CNG ENERGY" Banja Luka (from 24.06.2015., 10 years), "Prvo gasno društvo" d.o.o. Zvornik (from 28.04.2017., 10 years), "Rafinerija nafte Brod" a.d. Brod (from 25.03.2023., 5 years), "OPTIMA Grupa" d.o.o. Banja Luka (from 19.08.2023., 5 years), "BIJELJINA-GAS" Bijeljina (from 09.03.2023., 5 years), and "ALUMINA" d.o.o. services Zvornik (from 20.07.2023., 2 years). Only "GAS-PROMET" a.d. Pale (from 04.03.2021., 15 years) has a permit for the transport and management of the natural gas transmission system. For the management of compressed natural gas plants "Rafinerija nafte Brod" (from 13.5.2022., 2 years) and "Prvo gasno društvo " d.o.o. Zvornik (from 10.11.2022., 2 years) hold permits.

¹⁰⁶ <https://reers.ba/o-nama/opste-informacije/>

¹⁰⁷ <https://reers.ba/registar-dozvola/prirodni-gas/>

**5.1.2.3 BH-Gas d.o.o.
Sarajevo**

The Government of the Federation of BiH is the owner and manages the Company through the company's bodies consisting of the Assembly, the Supervisory Board, the Audit Committee and the Management Board of the Company¹⁰⁸. Information on the members of the Assembly is not available on the official website¹⁰⁹. The previous convocation of the Supervisory Board has expired, and a new Supervisory Board is expected¹¹⁰ to be appointed. The Audit Committee consists of President Selma Šahbaz and members Irfan Ljubunčić and Nedim Čustović¹¹¹. The Management Board consists of Director Nihada Glamoč and Executive Director Mihajlo Krmpotić.

The main activities of the Company for gas production and transport "BH-Gas" d.o.o. Sarajevo are the transport of natural gas through the Federation of BiH and research and development of main gas pipelines. On the company's website one can find a map (Figure 8) of existing and planned gas pipelines in BiH, and existing gas pipelines in neighbouring countries¹¹².

A key determinant of the state of gas supply infrastructure, not only in the RS but also in the Federation of BiH, is the fact that the whole country is connected to its surroundings exclusively by a gas pipeline connected to Serbia's gas infrastructure network. Therefore, currently, there is no possibility of diversifying the source of gas coming to BiH (until the new gas pipelines are built). Thus, BiH is in a situation where the supply of gas to BiH depends exclusively on Serbia, i.e. Russia, whose gas comes to BiH. On the same website one can find a map (Figure 24) of existing and planned natural gas supply corridors in Southeast Europe.

¹⁰⁸ <https://usaideia.ba/wp-content/uploads/2021/11/Dio-3-lzvjestaj-o-razdvajanja-djelatnosti-na-trzistu-prirodnog-gasa-u-BiH.pdf>

¹⁰⁹ <https://www.bh-gas.ba/skupstina/>

¹¹⁰ <https://www.bh-gas.ba/upravljacka-struktura/>

¹¹¹ Ibid

¹¹² <https://www.bh-gas.ba/mapa-gasovoda/>

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From this map it is evident that in addition to the possibility of supplying gas to BiH from Russia through Serbia, which is uncertain in the long term and in the medium term due to Russia's growing confrontation with almost the entire EU due to the war in Ukraine, only supply opportunities are provided through Turkey, which is again supplied from geopolitically extremely unstable or potentially unstable regions of the Caucasus, Central Asia and the Middle East. The other supply route comes from the LNG terminal in the Adriatic Sea, the only currently operating is the one in Croatia, on the island of Krk. On the official website of BH-Gas there is also a map of its distribution system within the FBiH¹¹³. The transition of the entire supply of the Federation of BiH with gas to the pipeline Turkish Stream, which transports Russian gas, caused great controversy in the public due to the increase in prices, the payment of penalties to the former Hungarian gas transmission system operator FSGZ due to the unilateral termination of the contract, and geopolitical connotation due to the Russian aggression against Ukraine¹¹⁴.

¹¹³ <https://www.bh-gas.ba/historija-djelatnosti-transporta-gasa-u-bih/>

¹¹⁴ <https://www.vecernji.ba/vijesti/sipa-istrazuje-aferu-koja-je-ugrozila-plinovod-s-rh-a-teza-je-od-respiratora-1625311>

<https://n1info.ba/vijesti/salkic-ako-predjemo-na-turski-tok-morat-cemo-platiti-23-miliona-dolara-madjarskoj/>

<https://www.klix.ba/vijesti/rusija-pojacala-isporku-plina-preko-turskog-toka-preko-kojeg-se-snabdijeva-i-bih/220813042>

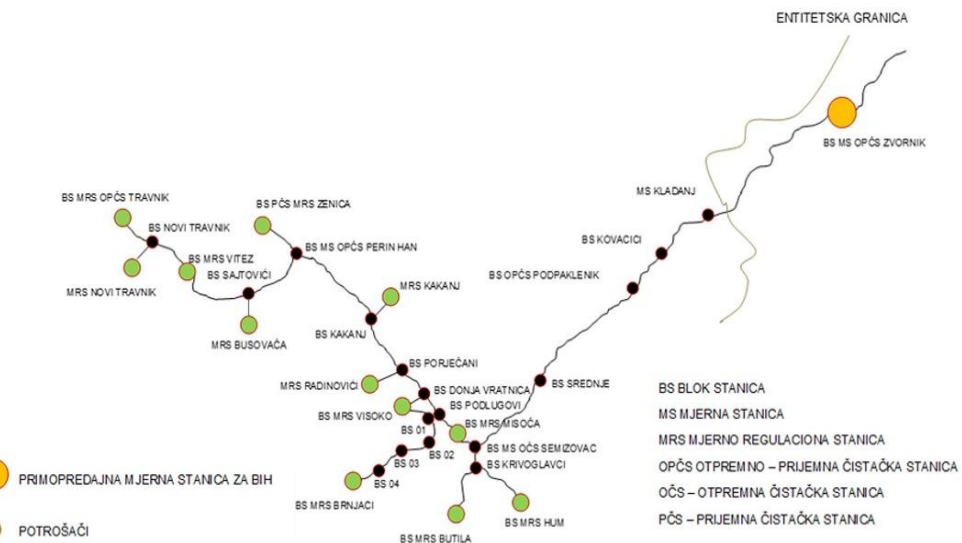


Figure 31 BH-Gas distribution system

It is evident that the existing distribution network covers only a small part of the Federation of BiH, although relatively densely populated, on the territory of Sarajevo canton, Zenica-Doboj canton/county, and Central Bosnia canton/county. On the same website one can find data on the gas transmission system of the FBiH, which has a total length of 196.1 km, i.e. about its sections and their diameter and length.

Table 51 Data on BH-Gas gas pipeline sections

Ordinal	Section	Diameter	Length
1.	Kladanj – Sarajevo	DN400	74.6 km
2.	Semizovac – Zenica	DN400	54.65 km
2.1	Branch gas pipeline Poriječani- Radinovići	DN150	3.75 km
2.2	Branch gas pipeline Donja Vratnica- Visoko	DN150	2.9 km
2.3	Branch gas pipeline Visoko – Brnjaci	DN200	17.6 km
3.	Zenica – Travnik	DN400	36.2 km
3.1	Branch gas pipeline for Busovača	DN200	3.2 km
3.2	Branch gas pipeline for Novi Travnik	DN200	3.2 km

Within this system there are pipelines with a maximum working pressure of 50 bar, diameter DN 400 and a length of 165.45 km, those with a maximum working pressure of 50 bar, diameters from DN 150 to DN 200 and a length of 13.05 km, as well as those with a maximum working pressure of 20 bar, diameter DN 200 and a length of 17.6 km. There is also an entry measuring station in Kladanj at the junction with the transport system Sarajevo-gas a.d. Istočno Sarajevo, 14 output measuring stations for connection of 7 distribution systems and 7 final gas customers, 7 dispatch/reception cleaning stations on 3 main routes, 28 blocking stations on 3 main routes, 16 cathode protection stations, remote monitoring, control and data collection system (SCADA), and communication system (GPRS, optical, radio). The designed capacity of the system is 1.25 billion Sm³ per year, and the transmission capacity of the system is 750 million Sm³ per year.

Figure 32 Distribution capacities of KJKP "Sarajevogas" d.o.o.

Sarajevogas serves approximately 65,000 active customers of natural gas, including KJKP "Toplane-Sarajevo" d.o.o. Sarajevo. A special customer is "Sarajevo-gas" a.d. Istočno Sarajevo for which the company only does the transportation of gas¹¹⁷. Available capacities for gas distribution maintained and operated by Sarajevogas are 3 main measuring and control stations (Butila, Hum and Misoča), 107 control stations, 227 reception and control stations, 737 measuring and control lines, approximately 103.7 km of gas network of pressure 8 (14.5) bar, approximately 107.3 km of pressure 3 (4) bar, and approximately 1,127.9 km of low-pressure distribution gas network with associated service connections¹¹⁸.

Compared to the distribution infrastructure of the entire FBiH, the one in Sarajevo Canton is by far the best developed.

5.1.2.5 Gas Promet Istočno Sarajevo – Pale

By the decision of the Government of the Republika Srpska of July 29, 1998, ODP "Gas Promet" Srpsko Sarajevo was established, as a state-owned company for import, supply and transport of natural gas. In 2005, after the ownership transformation of the state capital, the company organized and registered itself as a Joint Stock Company for import, supply and transport of natural gas "Gas Promet" Istočno Sarajevo – Pale. The ownership structure of capital in the Company is as follows: JP "Srbijagas" 39.14%, The Share Fund of the Republika Srpska (state capital) 26.09%, Pension Reserve Fund 10%, Restitution Fund of the Republika Srpska 5%, Investment funds and natural persons 19.77%¹¹⁹.

¹¹⁷ <https://www.sarajevogas.ba/osnovni-podaci/>

¹¹⁸ Ibid

¹¹⁹ <https://www.gaspromet.com/osnovni-podaci/>

"Gas Promet" a.d., Pale manages the natural gas transmission system in the Republika Srpska. The capacity of the natural gas transmission system is about 750 million Sm³/year, and the designed pressure is 50 bar. The pipeline is designed and built according to ANSI B31.8 regulation, and the quality of the pipe material is API 5LX 52. The steel pipes are factory pre-insulated with polyethylene, and the complete system is covered by cathodic protection. The working pressure of the Transport System of the Republika Srpska ranges from 30 to 45 bar. "Gas Promet" a.d., Pale performs the activity of natural gas transport on the section of the main gas pipeline "Šepak – Karakaj" and the high-pressure gas pipeline "Karakaj – Zvornik", while on the section of the main gas pipeline "Karakaj – Entity border with the FBiH" the activity of transport is performed by "Sarajevo-Gas" a.d., Istočno Sarajevo. At the Entity border, the transport activity is taken over by "BH Gas" d.o.o. Sarajevo.¹²⁰.

The natural gas transmission system in the RS consists of ¹²¹:

- main gas pipeline "Šepak – Karakaj" with BS "Šepak" and reception cleaning station in Karakaj
- PPS "Karakaj" (three measuring lines with ultrasonic flow meters and natural gas flow regulators)
- GMRS "Alumina" (two measuring and regulating lines for the needs of the alumina factory and the third control line with MS "Industrial Zone" for the needs of consumers in the industrial zone in Karakaj)
- MS "KPG station" (high pressure output for compressed natural gas production)
- high-pressure gas pipeline "Karakaj – Zvornik" with control MS "Karakaj"
- GMRS "Zvornik" (supplies the city of Zvornik and Mali Zvornik in Serbia; gas distributor in Zvornik is "Zvornik-stan" a.d.)
- MS "Sarajevo" (supplies consumers in the FBiH and the city of Istočno Sarajevo; gas distributor in Istočno Sarajevo is "Sarajevo-Gas" a.d.)

¹²⁰ <https://www.gaspromet.com/transportni-sistem-prirodnog-gasa/>

¹²¹ Ibid

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- main gas pipeline "Karakaj – Entity border with FBiH" with dispatch cleaning station in Karakaj and BS "Šekovići"

The natural gas market in Republika Srpska is limited to the narrow area through which the transport pipeline passes. Natural gas consumption in RS is low. The largest share of gas consumption is held by industry – about 91%. In order to meet the future needs for natural gas, it will be necessary to expand and make the most of the existing transmission system, while simultaneously building a new main gas pipeline. Given the favourable geographical distribution of larger populated places in Republika Srpska, a new main gas pipeline is planned in the northern part of Republika Srpska, through Semberija, Posavina and Krajina. The new planned interconnection point would be near Bijeljina and through it the transport system of RS / BiH would be connected with the transport system of the Republic of Serbia. This would create the possibility of supplying natural gas both from the existing "Ukrainian route", but also from the "Turkish Stream"¹²².

¹²² <https://www.gaspromet.com/strategija-razvoja/>

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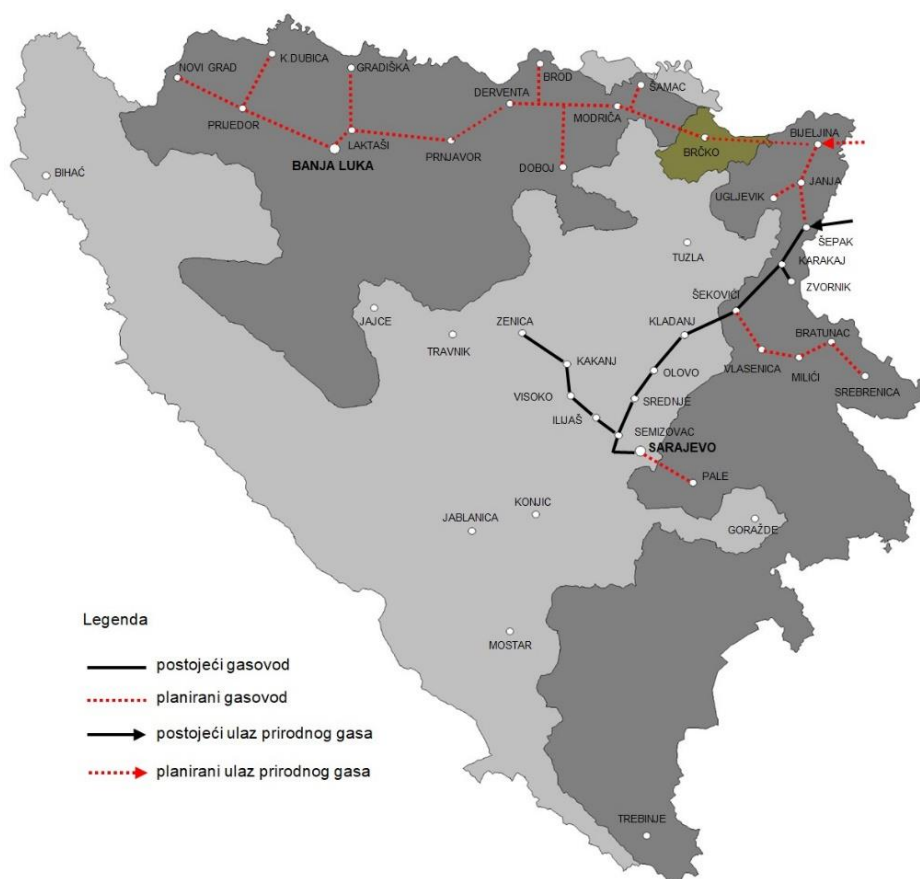


Figure 33 Existing and planned gas pipelines of Gas Promet

5.1.3 Oil

As in the case of electricity and gas, the website of the Federal Ministry of Energy, Mining and Industry does not contain any data on capacities in the field of oil. At the state level, there is also no regulator as in the case of gas.

**5.1.3.1 Ministry of
Industry, Energy
and Mining of
the Republika
Srpska**

In the already mentioned Energy Development Strategy of the Republika Srpska until 2035¹²³, it can be found that the entire activity of oil production and exploration in the RS is performed by the company Jadran – Naftagas d.o.o. Banja Luka, and the entire activity of import of crude oil and processing by Optima Group, containing oil refineries “Rafinerija nafte Brod” and the “Rafinerija ulja Modriča”. Optima Group also performs 95% of petroleum products wholesale¹²⁴, while the strongest actors in retail are Nestro Petrol with 18% and the company “Nešković” with 7%¹²⁵. In the field of consumption, 46% is occupied by transport, 36% by energy production and industry, and 18% by households and other consumers.

An interesting fact is that Jadran – Naftagas d.o.o. Banja Luka does not have its own website at all. The company was founded by Naftna Industrija Srbije (NIS) and Zarubezhneft, which has later withdrawn from the ownership. The majority owner of NIS is the Russian company Gazprom. The concession contract for the exploration and use of oil and gas with the Government of the Republika Srpska was signed in 2011 for 25 years¹²⁶. The continuation of exploitation in the Obudovac exploitation field implies the movement of the well fluid through a closed system of above ground pipes. The balance sheet of oil and dissolved gas reserves are classified as category A reserves. The expected oil production is: Ob-2 10.5 tons/day; Ob-3 9.5 tons/day. The

¹²³ [https://www.vladars.net/sr-SP-](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/StrategijaEnergetike2035Latinica.pdf)

[Cyrl/Vlada/Ministarstva/mper/std/Documents/StrategijaEnergetike2035Latinica.pdf](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mper/std/Documents/StrategijaEnergetike2035Latinica.pdf)

¹²⁴ Estimate based on the amount of imports and total consumption of petroleum products in the Republika Srpska.

¹²⁵ The percentage is the ratio of the number of gas stations of a particular company and the total number of stations

¹²⁶ <https://energijabalkana.net/srpska-geoloska-istrazivanja-kod-obudovca-u-rukama-jadran-naftagasa/>

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location of the Ob-2 exploration well is located 15 km southeast of Šamac, while the location of the Ob-3 exploration well is located about 14 km from the town of Šamac¹²⁷.

**5.1.3.2 Regulatory
Commission for
Energy of the
Republika
Srpska (RERS)**

On the RERS website one can find data that in the Republika Srpska the permit for performing the activity of oil derivatives production is held only by A.D. "Rafinerija Nafte" Brod (from 26.11.2015., period of validity 10 years), as well as for the activity of storage of oil and petroleum products with the same period of validity, and A.D. "Rafinerija ulja" Modriča (from 23.12.2015., period of validity 15 years)¹²⁸.

**5.1.3.3 Regulatory
Commission for
Energy in FBiH
(FERK)**

There are 27 companies in the Federation of BiH with the permit for storage of petroleum products (except LPG - liquefied petroleum gas).

¹²⁷ <https://ba.ekapija.com/news/4533068/real-estate/real-estate/investments>

¹²⁸ <https://reers.ba/registar-dozvola/nafta-i-derivati-nafte/>

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*Table 52 Permits for storage of petroleum products except LPG in the
Federation of BiH*

Canton/ County	Local Self- Government Unit	Number of permits	Total validity of permits in years
Sarajevo Canton	/	7	34
Zenica-Doboj Canton	Zenica	2	10
	Žepče	2	10
	Kakanj	1	5
	Visoko	1	5
	Tešanj	1	3
West Herzegovina County	Široki Brijeg	1	5
	Ljubuški	1	5
	Posušje	1	5
	Grude	1	5
Herzegovina- Neretva County	Mostar	2	10
	Stolac	2	9
Una-Sana Canton	Bihać	2	10
Central Bosnia County	Gornji Vakuf - Uskoplje	1	5
Tuzla Canton	Gradačac	1	5
Hercegbosna County	Tomislavgrad	1	5

Permits for trading LPG in the FBiH are shown in Table 54:

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Table 53 Permits for LPG trading in Federation of BiH

Canton/ County	Local Self- Government Unit	Number of permits	Total validity of permits in years
Sarajevo Canton	/	4	18
Central Bosnia County	Kiseljak	3	15
	Bugojno	1	5
	Gornji Vakuf – Uskoplje	1	5
	Novi Travnik	1	5
Zenica-Doboj Canton	Breza	1	5
	Tešanj	1	5
	Usora	1	5
Herzegovina-Neretva County	Mostar	2	10
Hercegbosna County	Tomislavgrad	2	10
Tuzla Canton	Gradačac	1	5
Una-Sana Canton	Cazin	1	5
Posavina County	Orašje	1	5

44 companies in the FBiH have permits for the transport of petroleum products by road:

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*Table 54 Permits for transport of petroleum products by road transport in the
Federation of BiH*

Canton/ County	Local Self- Government Unit	Number of permits	Total validity of permits in years
Zenica-Doboj Canton	Kakanj	3	14
	Tešanj	3	14
	Žepče	3	15
	Zenica	1	5
	Maglaj	1	5
Sarajevo Canton	/	5	24
Tuzla Canton	Srebrenik	2	8
	Gračanica	1	5
	Gradačac	1	5
	Kalesija	1	5
	Lukavac	1	5
Herzegovina-Neretva County	Stolac	3	12
	Mostar	1	5
	Čitluk	1	5
Central Bosnia County	Vitez	2	10
	Bugojno	1	5
	Kiseljak	1	5
	Novi Travnik	1	5
Una-Sana Canton	Bihać	2	8
	Cazin	2	8
	Bosanska Krupa	1	5
West Herzegovina County	Široki Brijeg	1	5
	Ljubuški	2	10
	Posušje	1	10
	Grude	1	5
Hercegbosna County	Tomislavgrad	1	5
Posavina County	Orašje	1	3

42 companies have the permit for wholesale of petroleum products (except LPG) in the FBiH:

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Table 55 Wholesale permits for petroleum products (excluding LPG)

Canton/ County	Local Self- Government Unit	Number of permits	Total validity of permits in years
Sarajevo Canton	/	12	57
Zenica-Doboj Canton	Žepče	2	10
	Tešanj	2	10
	Zenica	1	5
	Breza	1	5
	Kakanj	1	5
Central Bosnia County	Vitez	2	10
	Travnik	1	5
	Bugojno	1	3
	Kiseljak	1	5
	Gornji Vakuf- Uskoplje	1	5
Tuzla Canton	Tuzla	1	5
	Gračanica	1	5
	Kalesija	1	5
	Lukavac	1	5
West Herzegovina County	Ljubuški	1	5
	Posušje	1	10
	Grude	2	10
Una-Sana Canton	Cazin	2	10
	Bihać	1	5
	Bosanska Krupa	1	5
Herzegovina- Neretva County	Mostar	1	5
	Stolac	1	5
Hercegbosna County	Tomislavgrad	2	10
Posavina County	Orašje	1	5

**5.1.3.4 Operator -
Terminali
Federacije d.o.o.
Sarajevo**

The company "Operator – Terminali Federacije" d.o.o. Sarajevo, formerly called "Terminali Federacije" d.o.o. Sarajevo, was founded by the Decision of the Government of the Federation of BiH in 2003 with the core purpose of storing oil and petroleum products. They are 100% owned by the Government of the Federation of Bosnia and Herzegovina¹²⁹.

By subsequent decisions of the Government of the FBiH, the Company was allocated the assets of Energopetrol d.d., which is exempt from the recapitalization process by INA/MOL d.d.:

- terminal in the Port of Ploče, Republic of Croatia, containers with a capacity of 81.250m³,
- continental terminals in Živinice near Tuzla, Blažuj near Sarajevo, Mostar and Bihać, with a total storage capacity of 117,000m³ and 3,000m³ of capacity for LPG, on a total area of 385,457 m²,
- By a special Decision of the Government, the Company was allocated the property of the so-called military terminals, namely: Misoča-Ilijaš, Pajtov han-Vareš, Pokoj-Bihać, Dretelj-Čapljina and Raštani - Mostar.

The existing liquid fuel storage capacities, allocated by the Federation Government to the company for management and disposal, can be divided into above ground and underground ¹³⁰.

• Terminals above ground are located in Blažuj, Živinice, Mostar and Bihać. The storage capacity of liquid fuels at the specified locations is given in the table below. They total in 117,000 m³.

¹²⁹ <https://www.terminali.ba/>

¹³⁰ <https://www.terminali.ba/index.php/kapaciteti>

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- underground terminals - Pajtov Han, Misoča, Pokoj, Raštani and Pasci, with total capacity around 83 000 m³.

Table 56 Capacities of the above ground terminal in Blažuj

Label	Capacity (m3)	Tank type	Diameter (m)	Height (m)
R-01	10.000	Swimming	30,480	14,32
R-02	5.000	Swimming	24,384	12,80
R-03	5.000	Swimming	24,384	12,80
R-04	2.000	Fixed	15,240	12,80
R-05	10.000	Fixed	30,480	14,32
R-06	10.000	Fixed	30,480	14,32
TOTAL	42.000			
LPG	1.000	Sphere	12,5	

Table 57 Capacities of the above ground terminal in Živinice

Label	Capacity (m3)	Tank type	Diameter (m)	Height (m)
T-01	1.000	Fixed	15	6
T-02	500	Fixed	10	7
T-03	500	Fixed	10	7
T-04	5.000	Fixed	24	12
T-05	5.000	Fixed	24	12
T-06	2.700	Fixed	20	9
T-07	2.700	Fixed	20	9
TOTAL	17.400			
LPG	1.000	Sphere	12,5	

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Table 58 Capacities of the above ground terminal in Mostar

Label	Capacity (m3)	Tank type	Diameter (m)	Height (m)
R-05	6.800	Fixed	24,384	14,32
R-06	6.800	Swimming	24,384	12,80
R-07	6.800	Swimming	24,384	12,80
R-08	3.750	Swimming	18,280	12,80
R-09	2.500	Swimming	15,240	14,32
R-10	1.300	Swimming	13,716	14,32
R-11	2.860	Swimming	17,860	13,50
R-12	3.500	Swimming	21,080	12,80
R-18	2.800	Fixed	17,188	12,80
TOTAL	36.277			
LPG	1.000	Sphere	12,5	

Table 59 Capacities of the above ground terminal in Bihać

Label	Capacity (m3)	Tank type	Diameter (m)	Height (m)
R-01	2.700	Fixed	20,00	9,00
R-02	2.700	Fixed	20,00	9,00
R-03	5.000	Fixed	24,40	12,00
R-04	5.000	Fixed	24,40	12,00
R-05	2.700	Fixed	20,00	9,00
TOTAL	18.100			

5.2 Legislative framework

5.2.1 Law on Transmission of electric power, Regulator and System Operator of Bosnia and Herzegovina (2002)¹³¹

" This Law regulates establishment and work of a State Electricity Regulatory Commission, an Independent System Operator and a company for transmission of electric power, and defines the functions and authorities of these bodies.

The objective of this Law is to lay the basis for unlimited and free trade and a continuous supply of electricity at defined quality standards for the enjoyment of the citizens of Bosnia and Herzegovina. The Law is guided by prevailing international practices and applicable Directives of the European Union. The Law is intended to facilitate and advance the creation of an electricity market in Bosnia and Herzegovina and a regional electricity market."

"With respect to the transmission system in Bosnia and Herzegovina, regulation shall be carried out by the State Electricity Regulatory Commission (SERC), operation shall be carried out by the Independent System Operator (ISO), management of the transmission network and assets shall be carried out by the company for the transmission of electric power (Elektroprijenos Bosne i Hercegovine) and policy-making, in accordance with this Law, shall be carried out by the Ministry of Foreign Trade and Economic Relations (Ministry)".

"The electricity market in Bosnia and Herzegovina is a single unified economic space. Licences issued by the Entity regulatory bodies for trade in Bosnia and Herzegovina shall be valid in the territory of Bosnia and Herzegovina. This Law establishes the State Electricity Regulatory Commission, having jurisdiction and responsibility over transmission of electricity, transmission system

¹³¹ https://www.ferk.ba/_hr/images/stories/2014/zakon-o-prenosu-regulatoru-operateru-bih-0702-hr.pdf

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operations and foreign trade in electricity in accordance with international norms in harmony with European Union standards".

"SERC shall be composed of three (3) Commissioners, two (2) from the Federation of Bosnia and Herzegovina and one (1) from Republika Srpska, reflecting the equal representation of the constituent peoples of Bosnia and Herzegovina. The process of nomination and appointment shall be made in a prompt manner. Upon the recommendations of the respective Entity Governments, the Parliament of the Federation of Bosnia and Herzegovina and the Parliament of Republika Srpska, as appropriate, shall nominate the Commissioners of SERC. The Parliament of the Federation of Bosnia and Herzegovina shall nominate two (2) Commissioners. The Parliament of Republika Srpska shall nominate one (1) Commissioner. These nominations shall be submitted to the Council of Ministers. The Council of Ministers shall propose the appointment of the Commissioners nominated by the Entity Parliaments to the Parliament of Bosnia and Herzegovina (Parliament of BiH). The Parliament of BiH may accept or reject these nominations. Whenever a vacancy in SERC exists prior to the expiration of a term, the nomination and appointment process is the same as set forth above. The Parliament of the Federation of Bosnia and Herzegovina and the Parliament of Republika Srpska shall nominate Commissioners within thirty (30) days of the effectiveness of this Law or thirty (30) days of the creation of a vacancy at SERC. If either the Parliament of the Federation of Bosnia and Herzegovina or the Parliament of Republika Srpska fails to make such nomination within the time periods set forth in this Article, then the Government of the Federation of Bosnia and Herzegovina or the Government of Republika Srpska, as appropriate, shall, within ten (10) days thereafter, make such nomination. The Council of Ministers shall propose the nominee to the Parliament of BiH, which may accept or reject the replacement nominee. If the Parliament rejects a nomination of a Commissioner by one of the two Entity Parliaments, then the nominating Entity shall nominate another Commissioner and submit the nomination to the Council of Ministers."

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"All SERC decisions shall be approved by unanimous vote of all the Commissioners. In the event that the Commissioners fail to agree unanimously, then, upon notice by any one Commissioner to the others, all disputes shall proceed to arbitration. Within ninety (90) days after the appointment of the Commissioners pursuant to Article 4.4, the Commissioners shall implement rules and regulations to select an international arbitration commission or single arbitrator to act as a binding arbitrator to resolve disputes among the Commissioners, in the event that arbitration is necessary".

"Not later than 31 March 2002, a single ISO will be established with the status of a legal person under the laws of Bosnia and Herzegovina. The ISO shall manage the operation and dispatch of the transmission grid in Bosnia and Herzegovina and shall direct, schedule and coordinate maintenance, construction and expansion of the grid with the company for transmission of electric power."

"The ISO shall be a non-profit entity and shall be independent from any individual market participant and from activities of electricity production, distribution and supply. The ISO also shall not perform any electricity trade activity. In furtherance of the ISO's independence and authority, the owners of the company for transmission of electric power shall transfer to the ISO all relevant system operating authority. The ISO shall have full authority to coordinate the operation of the transmission system and shall be transferred the full authority to exercise its responsibilities."

"The property of Elektroprijenos BiH shall consist of the property used for transmission of electricity by the Federation of Bosnia and Herzegovina and Republika Srpska in Bosnia and Herzegovina."

**5.2.2 Law Establishing an Independent System Operator for the
Transmission System of Bosnia and Herzegovina (2004)¹³²**

"1. This Law establishes a non-profit Independent System Operator to manage the operation of the transmission system of Bosnia and Herzegovina, the Independent System Operator in Bosnia and Herzegovina (referred to hereafter as "the ISO"), and defines its functions, powers, governance and ownership. The ISO shall perform its activities in the entire territory of Bosnia and Herzegovina.

2. The objective of the Law is to establish an independent system operator and ensure a continuous supply of electricity at defined quality standards for the benefit of the citizens of Bosnia and Herzegovina. The Law is intended to facilitate the creation of a competitive electricity market in Bosnia and Herzegovina and its integration into a regional electricity markets and regional energy development activities. The Law is based on existing international practices and applicable Directives of the European Union (and their implementation in EU Member States)."

"1. The Management Board shall consist of seven (7) full voting Members with equal representation of constituent peoples in BiH and one (1) Independent Member.

2. The one (1) Independent Member with voting powers as set forth in Article 24 (Decision-making of the Management Board) of this Law shall be nominated by the Entity Government and appointed by the Council of Ministers. Article 48 (Independent Member Appointment and Status during Transition Period) shall control the appointment of the initial Independent Member. After the transition period, the Independent Member may be a citizen of any country. The term of the Independent Member shall be five years.

3. The seven full voting Management Board Members shall be nominated by the Entities. The allocation of Management Board appointments between the Entities shall be proportional to the net value of assets contributed by each

¹³² https://www.ferk.ba/_hr/images/stories/2014/zakon-o-osnivanju-nos-a-3504-bs.pdf

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Entity to the Transmission Company, as determined in the Statute of the Transmission Company.

4. The Government of the Federation of Bosnia and Herzegovina shall nominate the Management Board Members from the Federation of Bosnia and Herzegovina. The Government of Republika Srpska shall nominate the Management Board Members from Republika Srpska. The Council of Ministers shall vote to accept or reject the nominees. All initial Management Board Member appointments shall be completed consistent with Article 40 (Appointment and Initial Meeting of the Board).

5. The allocation of initial Management Board appointments and terms between the Entities shall be staggered as follows:

a) Two Members, one nominated by the Government of the Federation of Bosnia and Herzegovina, and one nominated by the Government of Republika Srpska, for five (5) years;

b) Two Members, one nominated by the Government of the Federation of Bosnia and Herzegovina, and one nominated by the Government of Republika Srpska, for four (4) years;

c) Two Members, one nominated by the Government of the Federation of Bosnia and Herzegovina, and one nominated by the Government of Republika Srpska, for three (3) years;

d) One Member nominated by the Government of the Federation of Bosnia and Herzegovina, for two (2) years.

"1. The Council of Ministers, the Government of Republika Srpska or the Government of the Federation of Bosnia and Herzegovina may initiate dissolution of the ISO. The approval of SERC shall be required prior to the commencement of the process to dissolve the ISO.

2. Within three (3) days following the initiation of dissolution and receipt of approval from SERC for such dissolution, a notice of the ISO's intent to dissolve shall be filed in accordance with the Law on Registration.

3. Subsequent to filing the notice of intent to dissolve, the ISO shall be dissolved in accordance with the procedures established by the Management Board and the applicable legislation governing the dissolution of companies registered under the Law on Registration.

5.2.3 Law on Energy and Regulation of Energy Activities of the Federation of Bosnia and Herzegovina (2022)¹³³

"(1) This Law regulates the manner of defining and implementing energy policy and development planning, acts defining and on the basis of which energy policy and energy development planning is implemented, commitment to the use of renewable energy sources and achieving energy efficiency, organization and functioning of the regulatory body and basic issues of performing and regulating energy activities in the Federation of Bosnia and Herzegovina (hereinafter: The Federation).

(2) This Law regulates issues that are of common interest for all energy activities or related to several forms of energy, whereby issues related to the sectors of electricity, natural gas, petroleum products, renewable energy sources and energy efficiency are regulated by special laws.

"(1) The Regulatory Commission for Energy in the Federation of Bosnia and Herzegovina (hereinafter: the Regulatory Commission) is a regulatory body that regulates and supervises the markets of electricity, natural gas and petroleum products in the Federation, based on the principles of impartiality, transparency, fairness, non-discrimination, competitiveness, independence and protection of market participants, in accordance with special laws governing the electricity sectors, renewable energy sources, energy efficiency, natural gas and petroleum products.

"(1) The Regulatory Commission shall have a Chairperson, elected by three members of the Regulatory Commission from among themselves".

"(1) Members of the Regulatory Commission shall be appointed by the Federation Parliament on the basis of a public competition".

(3) The procedure for the election and appointment of members of the Regulatory Commission shall be initiated by the Ministry upon notification of

¹³³ <https://fmeri.gov.ba/media/2222/zakon-o-energiji-i-regulaciji-energetskih-djelatnosti-u-fbih.pdf>

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the Regulatory Commission, no later than six months before the expiry of the term of office of a member of the Regulatory Commission.

(4) The Ministry shall obtain the authorisation of the Government of the Federation and announce a public competition published on the official website of the Ministry, and in at least two daily newspapers and the "Official Gazette of the Federation of BiH".

(5) The Government of the Federation appoints a commission for conducting a public competition for the election of members of the Regulatory Commission and establishing a ranking list of candidates (hereinafter: the Commission) which has five members.

(6) Members of the Commission shall be elected from among civil servants, academic community and prominent experts in the energy sector, and with years of work experience in the field of energy and they may not be employees of energy entities.

(7) The Decision on the appointment of the Commission shall be published in the "Official Gazette of the Federation of BiH" and on the official website of the Government of the Federation.

(8) The Commission shall conduct a public competition for the election of members of the Regulatory Commission and prepare and submit a report with a proposal of a ranking list of candidates within 60 days from the date of closing of the public competition.

(9) The Government of the Federation shall, within 30 days from the date of reception of the Report of the Commission, submit to the Parliament of the Federation a proposal for the appointment of candidates from the ranking list for a member of the Regulatory Commission.

(10) The Parliament of the Federation shall, on the basis of the proposal referred to in paragraph (9) of this Article, appoint a member of the Regulatory Commission.

(11) When appointing members of the Regulatory Commission, equal representation of constituent peoples in the Federation must be ensured.

5.2.4 Law on Electricity of the Federation of Bosnia and Herzegovina (2013, 2015, 2019, 2022)¹³⁴

(1) This Law regulates the functioning of the electric power sector, electric power industry activities, development of the electricity market, regulating of the market, general conditions for electricity delivery, planning and development, construction, reconstruction and maintenance of electric power facilities, supervision over the compliance with the Law and other issues significant for conducting electric power industry activities in the Federation of Bosnia and Herzegovina (hereinafter: the Federation).

(2) Electricity transmission, activities related to the transmission, international trade, managing the electric power system, balancing market and ancillary service market shall not be regulated by this Law.

"(8) Electric Power Strategy of the Federation shall be created in accordance with the international norms and standards of the European Union, including the ecological standards and principles of environment protection.

(9) Electric power strategy of the Federation shall be prepared in cooperation with the cantons".

"(1) In accordance with the provisions of the Treaty establishing Energy Community of the southeast Europe, the acts of the State Regulatory Commission for Electricity (hereinafter: SERC), the acts of the Regulatory Commission and this law, basic guidelines of functioning, development and supervision of electricity market shall be established.

(2) Development of the electricity market shall be conducted in accordance with the Electric Power Policy, power sector reform, this Law, implementing provisions passed on the basis of the law and acts of SERC and the Regulatory Commission".

"(2) Regulatory Commission shall cooperate with SERC, Independent system operator of Bosnia and Herzegovina (hereinafter: ISO BiH) and a uniform

¹³⁴ https://advokat-prnjavorac.com/zakoni/Zakon_o_elektricnoj_energiji_u_FBiH.pdf

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company for the transmission of electricity in Bosnia and Herzegovina, Elektroprijenos Bosnia and Herzegovina (hereinafter: Elektroprijenos BiH)".

"(1) Members of the Regulatory Commission shall be selected in the procedure conducted by the public competition, which shall be published in two daily newspapers at least and the Official Gazette of the Federation of BiH".

(2) On the basis of the authorizations of the Government of the Federation, the Ministry shall conduct a public competition from paragraph (1) of this Article.

(3) The ranking of candidates for members of the Regulatory Commission shall be established by the Ranking Commission ('the Commission').

(4) The Commission referred to in paragraph (3) of this Article shall be appointed by the Government of the Federation

(6) The Government of the Federation shall, within 30 days from the date of reception of the proposed ranking list by the Commission, establish the proposal for the appointment of members of the Regulatory Commission and submit it, with the prior obtained consent of the President and Vice-President of the Federation, to the Parliament of the Federation.

(7) The Parliament of the Federation shall, on the basis of the proposal referred to in paragraph (6) of this Article, appoint the members of the Regulatory Commission.

(8) When appointing members of the Regulatory Commission, equal representation of all constituent peoples in the Federation must be ensured".

"(1) For the operation, management, maintenance, construction and development of the distribution system, an electric power entity that holds a license to perform distribution activities (hereinafter referred to as the Distribution System Operator) shall be responsible.

(2) The distribution system operator shall, on the basis of the request of the users of the distribution system, enable the distribution of electricity through its network as well as the distribution of electricity in its area of service provision, including the management of the distribution system, all in accordance with the technical capabilities of the distribution system".

5.2.5 Law on Petroleum Products of the Federation of Bosnia and Herzegovina (2014)¹³⁵

"The Law on Petroleum Products in the Federation of Bosnia and Herzegovina (hereinafter: the Law) regulates: strategy of development of the oil sector, policy of development of the oil sector, strategic plan for the development of the oil sector, action plan, harmonization of plans, balance of petroleum products, energy activities in the sector of oil industry, conditions and manner of performing energy activities, import of petroleum products, submission of data, regulation of the oil sector, competences and obligations of the Regulatory Commission for energy in the Federation of Bosnia and Herzegovina, operating license, content and manner of issuing a work permit, register of operating licenses, safe supply of the market with petroleum products, price of petroleum products, fee for the establishment of reserves of petroleum products, quality of petroleum products, marking of pumping utensils, quality control, placing on the market LPG in cylinders, operational stocks, mandatory stocks, reserves of petroleum products, establishment and activity of the Petroleum Products Reserve Operator, administrative and inspection supervision".

"(1) This Law establishes the petroleum products reserve operator and determines the objectives of operations and activity, capital, ownership, authorizations, bodies, financial plan and notification and other issues relevant to the operation of the Operator.

(2) The operator referred to in paragraph (1) of this Article operates under the name "Operator – Terminali Federacije " d.o.o. Sarajevo."

"The bodies of the Operator are the Assembly, the Supervisory Board, the Management Board and the Audit Committee".

"(1) Operational stocks shall be formed in order to ensure the stability of electricity and/or thermal energy production for the market and for

¹³⁵ <https://advokat-prnjavorac.com/zakoni/Zakon-o-naftnim-derivatima-u-FBiH.pdf>

customers who require special security and quality of supply in the Federation of BiH, and for the stable and safe operation of air traffic.

(2) Operational stocks shall be formed at the level of fifteen-day average needs in the previous calendar year.

(3) Operational stocks shall be formed for the following petroleum products: diesel fuels, fuel oils, jet engine fuel and LPG, exclusively in tanks located on the territory of the Federation of Bosnia and Herzegovina“.

5.2.6 Law on Energy of the Republika Srpska¹³⁶

"This Law regulates the basics of energy policy of the Republika Srpska, the adoption of the energy development strategy, plans, programs and other acts for its implementation, the basic issues of regulating and performing energy activities, the use of renewable energy sources and the conditions for achieving energy efficiency".

"(1) The Regulatory Commission for Energy of the Republika Srpska (hereinafter: the Regulatory Commission) shall have the status of a legal entity, with rights and obligations established by this Law, laws whose provisions regulate the performance of certain energy activities and the Statute of the Regulatory Commission and shall be entered in the court register".

"(1) The Regulatory Commission shall consist of the President and four members of the Regulatory Commission, appointed by the National Assembly of the Republika Srpska at the proposal of the Government, on the basis of a public competition.

(2) The term of office of the President and members of the Regulatory Commission shall be five years“.

¹³⁶ <https://faolex.fao.org/docs/pdf/bih169586.pdf>

5.2.7 Law on Electricity of the Republika Srpska¹³⁷

"The Law on Electricity (Law) establishes rules for the generation and distribution of electricity on the territory of the Republika Srpska and domestic trade on behalf of the Republika Srpska. The law regulates the establishment and operation of the power system exclusively in the aforementioned areas. The aim of this Law is to determine the conditions necessary for rational and economic development of electricity generation and distribution activities in the territory of the Republika Srpska, to create conditions for life and work and to promote companies for the provision of public services for unhindered supply of electricity to consumers. The law is based on generally accepted international standards in the field of electricity and seeks to promote gradual liberalization of the national electricity market. In doing so, the Law follows the principles of non-discrimination and equality of persons and property."

"This Law is in accordance with the Law on Transmission, the State Electricity Regulatory Commission and the Independent System Operator in Bosnia and Herzegovina (BiH Law) regulating the establishment and defining functions and powers of the State Electricity Regulatory Commission (SERC), the Independent System Operator (ISO) and the electricity transmission company. The Law of BiH shall have legal force at the level of Bosnia and Herzegovina over the transmission, SERC, ISO and functions related to the transmission, SERC and ISO in the Republika Srpska as well, with the aim of ensuring continuous delivery of electricity according to defined quality standards. In the event of a conflict of provisions of this Law and the Law on Transmission, the State Electricity Regulatory Commission and the Independent System Operator in Bosnia and Herzegovina in connection with transmission, transmission system operation and international trade, the provisions of the Law on Transmission, the State Electricity Regulatory Commission and the Independent System Operator in Bosnia and Herzegovina shall have legal force.

¹³⁷ <https://faolex.fao.org/docs/pdf/bih169584.pdf>

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"In order to regulate monopoly behaviour and ensure a transparent and non-discriminatory position of all participants in the energy market in the Republika Srpska, the Regulatory Commission for Energy of the Republika Srpska (hereinafter: Regulator) shall be established".

"The National Assembly of the Republika Srpska, at the proposal of the Government of the Republika Srpska, appoints the President and two members of the Regulator on the basis of a public competition. The term of office of a member of the Regulator lasts five years, but, due to the continuity of work, at the first appointment, the mandate of one member of the Regulator will last five, the second four and the third three years. Members of the Regulator in the first composition shall be appointed by the National Assembly within the deadline set by the Action Plan of the Republika Srpska for restructuring and privatization of the electricity sector in BiH".

**5.2.8 Draft Law on Gas of the Federation of Bosnia and Herzegovina
(2014)¹³⁸**

"(1) This Law regulates: strategy, policy and planning of the development of the gas sector, participants in the gas sector, rules and conditions for carrying out energy activities in the natural gas sector, separation of activities and functioning of the gas sector, system operators, third-party access to the natural gas system, gas market and market regulation, competences of the Regulatory Commission in the gas sector, energy licenses, technical regulations, construction and reconstruction of infrastructural facilities, rights and obligations of producers, suppliers and customers of gas, security of gas supply and measures in case of disruption in the gas market, administrative supervision and inspection, and other issues of importance for the gas sector in the Federation of Bosnia and Herzegovina (hereinafter: the Federation).

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https://parlamentfbih.gov.ba/dom_naroda/bos/parlament/propisi/El_materijali/Zakon%20o%20gasu%20FBiH_juli_2014.pdf

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(2) Regulation of natural gas transport, international trade, management, balancing and ancillary services of the transmission system, are not subject to this Law.

"(4) In order to ensure a regular, safe, reliable and quality gas supply at affordable prices, public services shall be performed as:

(a) transportation of natural gas;

(b) distribution of natural gas;

(c) storage of natural gas;

(d) management of the LNG system;

(e) gas supply:

1. performed by a backup supplier or public supplier of tariff customers until they acquire the status of qualified customers,

2. vulnerable customers;

3. qualified customers who are supplied by a public supplier".

(1) The transmission system operator, the distribution system operator, the gas storage system operator and the LNG system operator shall ensure efficient and non-discriminatory access to the transmission system network, the distribution system, the gas storage system and the LNG system in accordance with this Law and bylaws.

(2) Access to the distribution system, the gas storage system and the LNG plant shall be defined by the Regulatory Commission, all in terms of a regulated approach.

(3) The regulated approach shall be based on the published methodology and tariff system adopted by the Regulatory Commission, which shall be applied objectively and shall be equal for all participants in the gas market.

(4) Access to the transmission system shall be defined by a state-level regulator that adopts and publishes a methodology for gas system transport and balancing services, as well as a methodology for determining the cost of connection to the transmission system.

(5) Regulator at the state level adopts rules defining the allocation of cross-border gas capacities and gas transit through BiH".

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(1) The transmission system operator, the distribution system operator, the storage system operator and the LNG system operator shall have the right to refuse access to the system in the case of:

- a) lack of capacity and/or technical incompatibility of the system;
- b) if access to the system would prevent it from performing public service;
- c) where access to the system could cause serious financial and economic difficulties to the energy entity in respect of take-or-pay contracts concluded prior to the submission of the application for access, under the conditions referred to in Article 43 of this Law.

(2) The distribution system operator, the gas storage system operator and the LNG system operator shall inform the party in writing of the reasons for the refusal of access, in case of refusal of access to the system. A party who has been denied access to the system or who objects to the conditions of access to the system may lodge a complaint with the Regulatory Commission.

(3) The decision of the Regulatory Commission is final and an administrative dispute may be initiated against it. The administrative dispute is initiated by filing a lawsuit with the competent court. An action for initiating an administrative dispute shall not delay the execution of an individual act against which an administrative dispute has been initiated, unless the competent court decides otherwise.

(4) A distribution system operator, a storage system operator and an LNG system operator who refuses access to the system due to lack of capacity or lack of connection must, within a reasonable time, make the necessary modifications and interventions in the system to provide access if they are economically viable or if a potential user is willing to finance them.

(5) The refusal of access by a third party to the transport system shall be defined by the regulator at the state level within the framework of the preparation and adoption of the documents referred to in paragraph (4) of Article 40 of this Law“.

5.2.9 Law on Gas of the Republika Srpska (2021.)¹³⁹

"This Law regulates the manner of organizing and performing energy activities in the natural gas sector, the competences of the Energy Regulatory Commission of the Republika Srpska in the natural gas sector, conditions for orderly, quality and safe supply of natural gas to customers, access to the natural gas market, as well as the rights and obligations of market participants, protection of customers, and supervision of the implementation of this law and other issues of importance for regulating the natural gas sector."

"(1) The objective of this Law is to:

- 1) establish the criteria and procedures applicable for granting authorization to perform activities in the natural gas sector, provide legal frameworks for companies for the provision of public services to uninterrupted supply of natural gas to consumers and supervision of the performance of these activities;
- 2) establish a legal framework for unrestricted trade and uninterrupted supply of natural gas according to defined quality standards for the benefit of customers;
- 3) ensure the safe, reliable and efficient operation of the natural gas transmission system and the provision of services of transport and management of natural gas transmission system to all users of the system, as well as other systems, facilities and activities in the natural gas sector;
- 4) determine the rights and obligations of energy entities performing activities in the natural gas sector in the manner and under the conditions established by this Law and establish in more detail the rights and obligations of the Regulatory Commission, as well as the legal basis for mutual relations of energy entities performing activities in the natural gas sector and their relations with the Regulatory Commission for Energy of the Republika Srpska (hereinafter: the Regulatory Commission),

¹³⁹ <https://www.paragraf.ba/propisi/republika-srpska/zakon-o-gasu.html>

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5) meet the conditions for further development of an open natural gas market based on the principles of competition, non-discrimination, publicity and transparency;

(6) lay down rules for the organisation and operation of the natural gas market, including its further development and integration into the pan-European market;

(7) ensure the effective separation of the transmission system operator and its independence from other activities relating to natural gas and from other commercial interests;

8) create the conditions for appropriate investments in the natural gas sector,

9) establish the legal basis for regional and international cooperation between transmission system operators and other energy entities on the gas market of the Republika Srpska, as well as for mutual cooperation between competent authorities, regulatory commission, institutions and other public bodies.

(2) The provisions of this Law shall apply to biogas and gas from biomass or other types of gases where such gases can be technically and safely transported through natural gas systems."

"This Law regulates the following energy activities in the natural gas sector:

1) the production of natural gas,

2) transport and management of the natural gas transmission system,

3) trade and supply of natural gas,

4) distribution and management of the natural gas distribution system,

5) storage and management of the natural gas storage system,

6) management of the liquefied natural gas plant,

7) management of compressed natural gas plant".

5.2.10 Law on Petroleum Products in the Federation of Bosnia and Herzegovina (2014)¹⁴⁰

"The Law on Petroleum Products in the Federation of Bosnia and Herzegovina (hereinafter: the Law) regulates: strategy of development of the oil sector,

¹⁴⁰ <https://advokat-prnjavorac.com/zakoni/Zakon-o-naftnim-derivatima-u-FBiH.pdf>

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policy of development of the oil sector, strategic plan for the development of the oil sector, action plan, harmonization of plans, balance of petroleum products, energy activities in the sector of oil industry, conditions and manner of performing energy activities, import of petroleum products, submission of data, regulation of the oil sector, competences and obligations of the Regulatory Commission for energy in the Federation of Bosnia and Herzegovina, operating license, content and manner of issuing a work permit, register of operating licenses, safe supply of the market with petroleum products, price of petroleum products, fee for the establishment of reserves of petroleum products, quality of petroleum products, marking of pumping utensils, quality control, placing on the market LPG in cylinders, operational stocks, mandatory stocks, reserves of petroleum products, establishment and activity of the Petroleum Products Reserve Operator, administrative and inspection supervision".

"Energy activities in the oil industry sector within the scope of this Law are:

- (a) production of petroleum products,
- (b) wholesale of petroleum products with the exception of LPG;
- (c) transport of petroleum products by road or rail,
- (d) retail sale of petroleum products,
- (e) storage of petroleum products with the exception of LPG,
- (a) LPG trading.

(1) The Regulatory Commission, within the meaning of this Law, shall have the following competences:

- (a) monitoring and regulating relations between importers, wholesalers, retailers, transporters and buyers of petroleum products in accordance with this Law and implementing acts of the Regulatory Commission;
- b) issuing or revoking licenses for performing energy activities.

(2) The Regulatory Commission shall ensure non-discrimination, efficient competition and the efficient functioning of the petroleum products market, paying particular attention to the security of supply of petroleum products.

(3) The Regulatory Commission shall be financed from revenues from regulatory and one-off fees to be collected from license holders engaged in

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energy activities referred to in Article 9 of this Law and revenues from fees for permits issued, including reimbursement of costs based on arbitration.

(4) The amount of fees referred to in paragraph (3) of this Article shall be determined in such a way as to cover the real costs of operation of the Regulatory Commission.

"(1) Reserves of petroleum products shall be formed and used to ensure the supply of petroleum products of the Federation of BiH in the event of a threat to energy security caused by extraordinary supply disruptions.

(2) The Government, at the proposal of the Ministry, shall adopt a decision and conditions under which the reserves of petroleum products referred to in paragraph (1) of this Article are released on the market and used.

(3) The decision referred to in paragraph (2) of this Article shall also determine the energy entities that are obliged to make the distribution of reserves of petroleum products in the territory of the Federation of BiH.

(4) The reserves referred to in paragraph (1) of this Article include the following groups of petroleum products:

- (a) motor gasoline,
- (b) diesel fuel and
- c) fuel oil – LUEL.

(5) Reserves of petroleum products referred to in paragraph (3) of this Article shall be kept in finished products exclusively in warehouses owned by the Operator and may not be subject to execution.

(6) Warehouses referred to in paragraph (5) of this Article may also be registered as customs warehouses in accordance with special regulations.

(7) Warehouses referred to in paragraph (5) of this Article may be rented to other energy entities in accordance with the laws.

(8) At the proposal of the Operator, the Minister shall adopt a regulation defining the method of insurance, organization of storage, regional schedule and dynamics of formation and renewal of reserves of petroleum products.

5.2.11 Law on Oil and Petroleum Products of the Republika Srpska (2012)¹⁴¹

(1) This Law regulates activities in the field of oil and petroleum products, their regulation, the functioning of oil and petroleum products market, conditions for quality and safe supply of oil and petroleum products customers and the formation and maintenance of operational and mandatory reserves of petroleum products.

(2) The provisions of this Law shall not apply to the collection-transport and storage systems of oil in production fields.

Energy activities in the field of oil and petroleum products in terms of this Law are:

- a) production of petroleum products,
- b) transport of oil by pipelines,
- c) transport of petroleum products by product pipelines,
- d) transport of oil and petroleum products by other means of transport,
- e) wholesale of petroleum products,
- f) retail sale of petroleum products; and
- g) storage of oil and petroleum products.

(1) Regulation of energy activities referred to in Article 11, paragraph 1 of this Law shall be carried out by the Regulatory Commission for Energy of the Republika Srpska (hereinafter: Regulatory Commission).

(2) The Regulatory Commission referred to in paragraph 1 of this Article shall be competent to:

- a) establish methodologies for calculating the costs of transporting oil by pipelines and transporting petroleum products by product pipelines,
- b) adopt a tariff system for calculating the price for the use of oil pipelines and product pipelines,
- c) approve the prices for the use of the pipeline and product pipeline,
- d) establish the criteria and prescribe the conditions for obtaining, amending, supplementing and revoking the license for performing activities, solving in the procedure for obtaining, amending, supplementing and revoking the

¹⁴¹ <https://www.paragraf.ba/propisi/republika-srpska/zakon-o-nafti-i-derivatima-nafte.html>

license for performing activities in the field of oil and petroleum products and keep a register of issued and temporarily or permanently revoked licenses for performing activities in the field of oil and petroleum products,

e) resolve in the second instance upon appeal,

f) supervise the performance of activities for which it issues licences in the field of oil and petroleum products in accordance with this Law and the principles laid down in this Law, including monitoring the application of tariff systems and methodologies for access and use of pipelines and product pipelines; and

g) perform other duties in accordance with this Law.

(1) Mandatory reserves of petroleum products shall be formed to ensure the security of supply of petroleum products in case of a threat to energy security in the territory of the Republika Srpska, due to unexpected supply disruptions.

(2) The reserve requirements will be formed successively from 1 January 2015 and include the following groups of petroleum products:

a) motor gasoline and gasoline for aircrafts,

b) diesel fuels, gaseous oils and fuel for jet engines; and

v) combustion oils (light, medium and heavy).

(3) Part of the reserve requirements referred to in paragraph 2 of this Article may include oil and semi-finished products, up to a maximum of 40% for groups a) and b), and up to 50% for group v).

(4) Mandatory reserves of petroleum products do not include commodity reserves, regulated by the applicable law on republic commodity reserves, nor operational reserves regulated by Article 18 of this Law, quantities of petroleum products contained in vehicle reservoirs and other means of transport, which are used exclusively for their operation, quantities of petroleum products found in railway tanks, tank trucks, reservoirs of gas stations, quantities of petroleum products stored by consumers etc.

(5) The Government shall, within one year from the date of entry into force of this Law, at the proposal of the Ministry, regulate the quantities, dynamics of the formation and renewal of mandatory reserves of petroleum products, the method of financing and the organization of their storage.

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(6) Formation, preservation and renewal of mandatory reserves of petroleum products shall be carried out by the Public Enterprise "Robne rezerve Republike Srpske" a.d. Banja Luka in accordance with the regulation referred to in paragraph 5 of this Article.

6 CHALLENGES OF ENERGY TRANSITION: PUBLIC OPINION RESEARCH IN BOSNIA AND HERZEGOVINA

6.1 Introduction

Conducted empirical research for the purposes of this paper tried to reach certain knowledge about the attitudes of the public in BiH in regard to the energy situation. This includes information about public attitudes towards the responsibility of various levels of government in BiH, opinion on possible external threats to the energy system, potential solutions in the form of construction of new electrical energy facilities and infrastructure, all the way to the respondents' forecast regarding possible energy crises in the future.

Public opinion is extremely important for several reasons. Participation in elections and voting is crucial in a democracy because it is the main mechanism of connecting citizens with political decisions through institutional representation. Also, the evaluation of various policies is of particular importance because it allows people to send reasonable signals to the government containing their opinion regarding policies (Lavine – Johnston - Steenbergen, 2012: 202). In this case, it's about sending energy policy signals. In addition to sending signals, there is an element of pressure on the ruling administration if policies corresponding to the common good are not implemented. In that case, the public can use various methods to obstruct unwanted policies. Such an example is evident in the various actions of non-governmental organisations which were aimed at opposing the construction of energy facilities, with a main goal to influence the ruling party to stop a particular project.

The general public is understood as the total population of an area, regardless of the opinion that the predominant part of the population is uninterested in many public topics. For example, Voldimer Key argued that only about ten percent of the population pays attention to even the most interesting political

events. This means that opinions about various problems in public opinion polling are most often actually the opinions of uninformed people. Nevertheless this does not diminish their significance because mass opinions are a relevant political factor. (Lamza Posavec, 1995: 21) And this document is guided by this principle, seeing public opinion as a set of opinions of individuals no matter how deeply versed in the subject they are.

For the purposes of the document, a survey was carried out involving 905 people. In the questionnaire that was available in electronic and paper form, questions are predominantly of closed type. The poll was open until early 2024.

The results of the research are a synthesis of empirical facts and are presented through tables and graphs.

The first part of the questionnaire was formulated with the intention of determining the sociodemographic determinants of the respondents. The sample of the examined persons is heterogeneous with approximate representation of male and female subjects, with a slightly higher percentage of women who participated in the research. About two-thirds of those surveyed were women and one-third were men. In terms of age structure, younger respondents are the most common, about two-thirds are people between the ages of 18 and 34. When it comes to professional qualifications, the greatest number of correspondents has a college or university degrees (49.5%), followed by those with secondary education (40.8%), while 8.4% have completed a master's degree or doctorate. The structure of the sample in terms of place of residence is also properly distributed, 59% of respondents live in the Federation of Bosnia and Herzegovina, and 41% in Republika Srpska.

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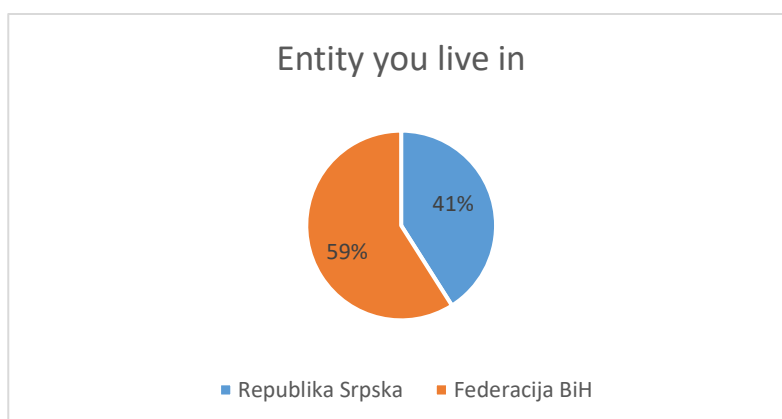


Figure 34 Entity in which respondents live

About a quarter of respondents said that they were not at all interested in energy policy in BiH, while 27.9% stated that they were quite or very interested in the issue of energy policy. Almost 40% of respondents are currently employed (38.8%), with a similar percentage of unemployed people (39.3%), while the rest are mostly members of the student population. The association between employment and interest in energy policy is statistically significant ($\rho = .079$; $p < 0.05$), i.e. employed persons are more interested in energy policy as well as those more educated ($\rho = .092$; $p < 0.05$). Association between age and interest in energy policy ($\rho = -.197$; $p < 0.01$) is also statistically significant and of a negative direction: with the increase of years the interest decreases.

In the first question related to the topic, respondents were asked to determine the importance of all levels of government in BiH in the field of energy policy. The largest number of respondents has highlighted the state level of government as the most responsible for the issue of energy policy. Almost three quarters of the respondents think that the state government is responsible for the energy security and independence of BiH, while 12.04% of them think that is primarily the responsibility of entity authorities. On the other hand, the majority considers the local government to be the least responsible for energy issues. The results are not surprising despite the

political structure of BiH in which the entity authorities have great autonomy, because the general public is still expected to see the state government as the final instance on which the most important decisions for the life of the people are made. The energy sector is indeed one of the most important areas on which the well-being of the general population depends. Spearman's correlation coefficient was calculated between variables of satisfaction with energy policy management in one's state (or entity) and age. The age of the respondents was statistically significant and positively associated with the variable of satisfaction with the way energy policy is managed ($\rho = 0.150$; $p < 0.01$), while according to the same coefficient of association between education and satisfaction with the energy policy management is significant and of negative direction, i.e. with the increase in the level of education, the aforementioned satisfaction decreases.

Perhaps the most interesting question is concerned with the public's trust towards certain institutions involved in energy policymaking. The fact that the largest percentage of respondents chose the European Union as the actor they trust the most in the field of energy policy should be singled out. As many as 42.76% stated that they somewhat or completely believe in the EU's ability to form energy policies for the benefit of citizens. Such results may be linked to the successful use of "soft power" by the EU. In doing so, we see soft power as "the universality of a state's culture and its ability to establish a set of favourable rules and institutions governing the field of international activity" (Nye, 1990: 182). With its structure, perception of an economic force, as well as its declarative commitment to a just system of governance, the EU manages to win over the citizens of poorer countries to a certain extent. Relatedly, the high level of public trust in the EU can be partly explained by Sanchez-Cuenc's thesis "that the level of trust in national institutions is inversely proportional to trust in supranational institutions" (Skoko - Bagić, 2011: 47). In other words, if citizens are satisfied with their government, if they have a good standard of living, security and low levels of corruption in society, they consequently have no reason to seek haven in some other government, even if it is the EU. In this case, it seems that the public in BiH

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still has a degree of confidence in the capabilities of the EU, at least in the field of energy policy. Interestingly, in earlier research, age was negatively associated with political confidence (Bäck - Kestilä, 2009), while this research shows different results. Among the younger respondents, most of them completely trust or somewhat trust multinational corporations. Among middle-aged people, most of them do not trust them at all or neither trust nor not trust, while among the elderly they neither trust nor not trust multinational companies. Furthermore, younger respondents mostly neither trust nor not trust or somewhat trust the Presidency of BiH, the Council of Ministers and entity authorities, while among older and middle-aged respondents most of them do not trust at all or neither trust nor not trust. Equally, older respondents generally neither trust nor not trust EU bodies, while middle-aged and younger respondents mostly trust the EU's ability to form energy policies for the benefit of citizens.

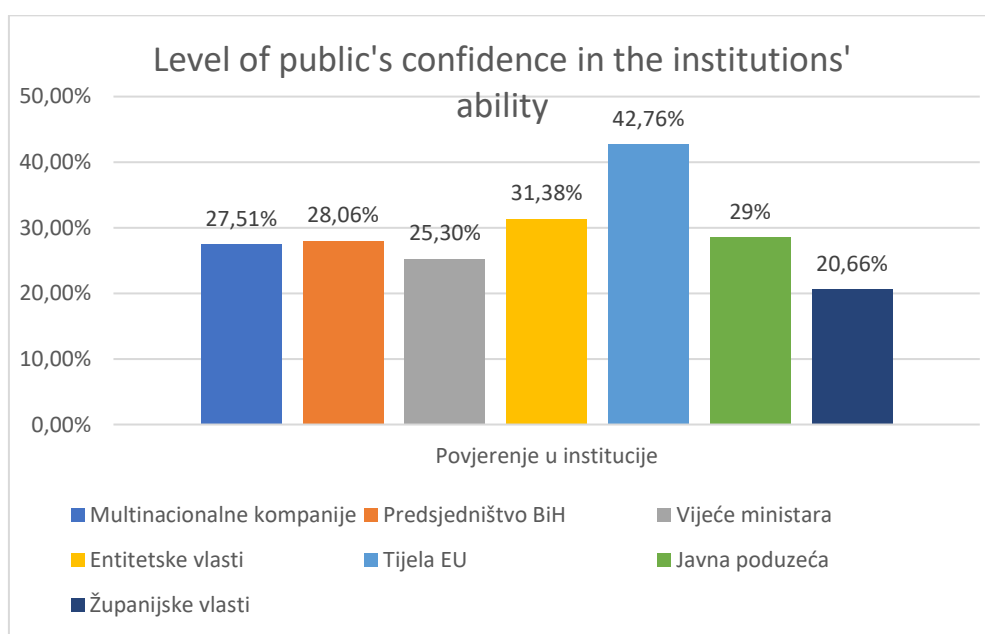


Figure 35 The level of public's confidence in the ability of these institutions to form energy policies for the benefit of citizens.

As mentioned, trust in the EU is by far the highest among respondents, while trust in county/cantonal authorities was the lowest, which can be explained by the fact that there are no counties/cantons in the RS system, so it is logical that respondents paid less attention to this level of government. A little less than a third of respondents (31.38%) said that they fully or somewhat trust the ability of entity authorities to form energy policies for the benefit of citizens. Trust in multinational companies, the BiH presidency, the Council of Ministers and public companies is at a similar level, about a quarter of respondents believe in the capabilities of these institutions in the field of energy policy.

6.2 Energy policy and the public in Bosnia and Herzegovina

It is not surprising that a significant number of respondents are generally dissatisfied with the management of energy policy in BiH, with an important note that the same levels of satisfaction or dissatisfaction expressed in the chart above refer to both the state and entity levels of government. In sum, 42.6% percent of respondents are either highly or somewhat dissatisfied. When we add a significant percentage of 43.2% of those benevolent who are neither satisfied nor dissatisfied, the current situation as far as energy policy is concerned cannot possibly be satisfactory. In pessimistic tone, one can even see the dominance of lethargy mixed with the usual negative attitude towards policies and political actors in BiH. In such context, energy policy can hardly be perceived significantly more positively. Thus, only 9.1% of respondents are very satisfied, when we add 13.1% of those who are somewhat satisfied it is quite clear that "positively minded" respondents make up a very slim minority of the population. However, when the results are viewed in the context of very little interest of respondents in energy policy topics, and that an extremely significant percentage of respondents are younger, it is possible to conclude in optimistic tones that the situation is fixable. Trust, interest and satisfaction with energy policy are mutually connected variables, and it is

exactly the future work of the competent institutions that will condition the direction in which the perception of BiH citizens will move. The large share of neutral respondents is a potential basis that will be a significant litmus paper of change of perception in the future and they will reflect the direction in which the energy sector and capacity within BiH are developing.

There are two statistically established facts that definitely need to be pointed out. The first one is concerned with the association between education and satisfaction with how energy policy is managed in one's country (or entity). It is statistically significant ($\rho = -0.137$; $p < 0.01$) and is negative, which means that with the increase of education, satisfaction with energy policy management decreases. Therefore, the more educated part of the population is less satisfied with the management of energy policy, which is very important, because as already indicated, there is a serious statistical correlation between the level of education and interest in energy policy. In other words, the more educated residents of BiH are obviously more informed about the details, or at least the principles of energy policies, which means that they are much more interested in this public policy, but at the same time much more dissatisfied with the current situation.

Another important established correlation is the association between age and satisfaction with how energy policy is managed in one's state (or entity). It is statistically significant ($\rho = 0.150$; $p < 0.01$), therefore, as age grows, so does satisfaction with the way energy policy is managed. Although it is somewhat less represented in the percentage of respondents, the older segment of the BiH population is obviously much more satisfied with the energy policy. However, this fact is somewhat paradoxical considering that a statistically significant correlation of the negative direction between age growth and interest in energy policy has been established. Therefore, it has already been established that older respondents are less interested in energy policy than younger respondents, which leads to a very surprising outcome. In short, the older population (56 years and older) is less interested, but also more satisfied with the management of energy policy compared to the other two younger

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age classes of respondents. This phenomenon could hardly be plausibly explained without a more detailed study of the population previously mentioned.

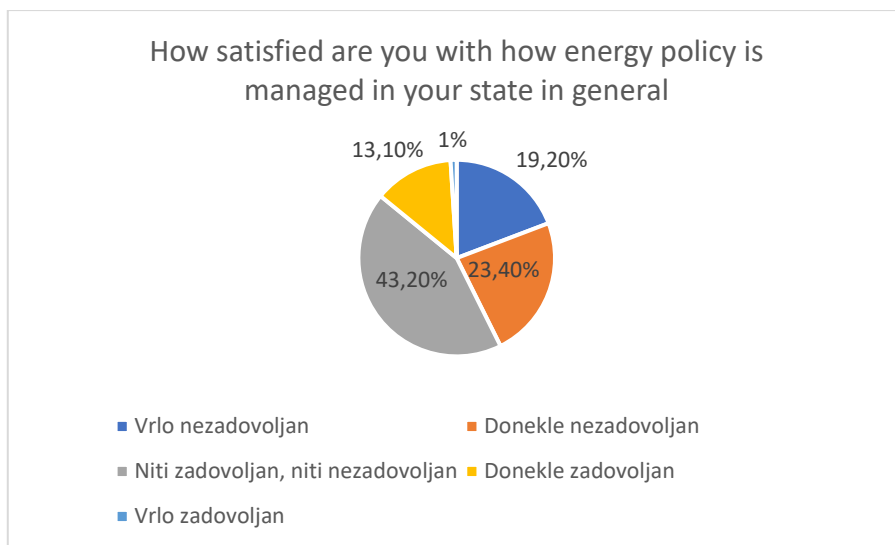


Figure 36 How satisfied are you with how energy policy is managed in your state (or entity) in general?

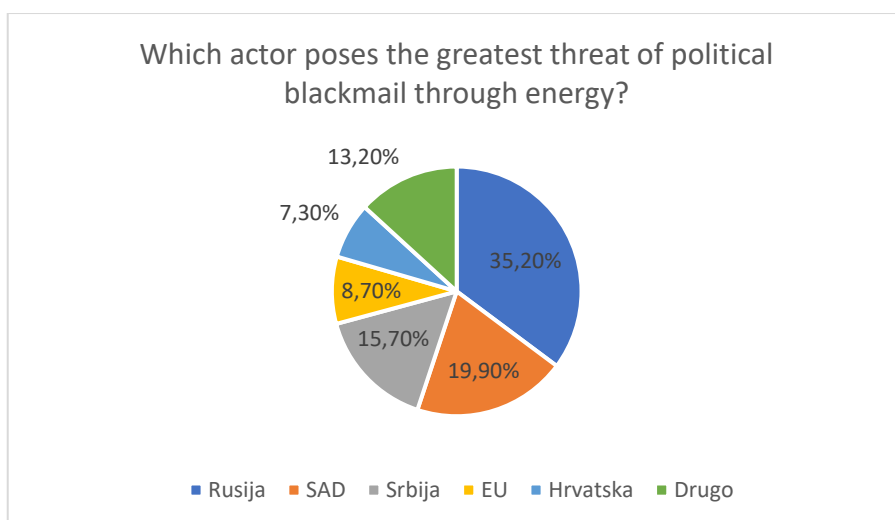


Figure 37 Which actor poses the greatest threat of political blackmail through energy?

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At the very beginning, it should be pointed out that this is a perception of respondents who were not asked to substantiate their position. It can be said that the results reflect the impression of citizens acquired through media-mediated content and information related to the energy sector, and potential threats that may arise within it.

Starting from the level of global and regional geopolitical actors, it is possible to conclude that the citizens of BiH perceive potential energy threats through blocs, and this impression is primarily influenced by the place of residence, i.e. which entity they belong to. Simply put, Russia is dominantly perceived (35.2% of respondents) as the actor from whom the greatest threat comes, which is not surprising given the context of the war in Ukraine and all the energetic disruptions caused by it. The media in the Federation of BiH, almost completely, reflected and reproduced the dominant Western media narrative in which Russia is pointed as the sole culprit, i.e. an aggressor and an actor who will try to further undermine the existing security architecture in Southeast Europe with their energy capacities. It can be said that the Bosniac and Croat media agree on this issue and that there was no difference between these two populations on this issue, and that together they consider Russia the most dangerous actor that can further destabilize BiH. In contrast, in Republika Srpska, the media narrative and public opinion is completely opposite. It does not perceive Russia as the main culprit for the conflict in Ukraine, but a geopolitical power that "had no other option" but a preventive attack on Ukraine so as not to let NATO expand to its state borders. The war itself is a sort of 'proxy conflict' that the West, above all the United States, is waging against the Russian people. In this perspective, it is possible to conclude that together the US (19.9%) and the EU (8.7%) form a bloc that is perceived as the biggest potential threat to the energy sector of BiH. The difference in percentages of this bloc versus Russia is the fact that a larger part of respondents comes from the Federation of BiH than from Republika Srpska.

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This is supported by the established statistical correlation between the entities in which the survey participants live and the actor from whom the most dangerous political blackmail through energy comes ($r=-.230$; $p<0.01$). Respondents living in Republika Srpska consider Western actors more dangerous, while respondents from the Federation of BiH consider Russia as the most dangerous actor. It is extremely interesting that important geopolitical actors who have their influence in BiH such as Saudi Arabia, Iran, and especially Turkey are not seen as potential actors who can threaten the energy policy of BiH by respondents. For all these countries the percentage of negative perception remained below the level of statistical error (2%). The percentage of almost 10% of respondents who consider another country a threat can be attributed to the lack of information of respondents about the topic of research.

In the aforementioned bloc optics of potential threat actors, it is necessary to observe the two most important neighbouring countries, i.e. the perception of Serbia and Croatia as the most dangerous actors for endangering energetics in BiH. All the statistical settings that we have clarified so far apply to these countries. Thus, respondents from Republika Srpska consider Croatia as a greater threat, while those from the Federation of BiH consider Serbia as a greater threat. This is not surprising because they are somehow perceived as kind of outposts or extended arms of two major blocs, regardless of the fact that Croatia actually fits that perception with its membership in NATO and the EU, while Serbia is a formally a neutral state. Also, the difference in percentages (Serbia 15.7%, Croatia 7.3%) can be attributed to a larger number of respondents from the Federation than the RS..

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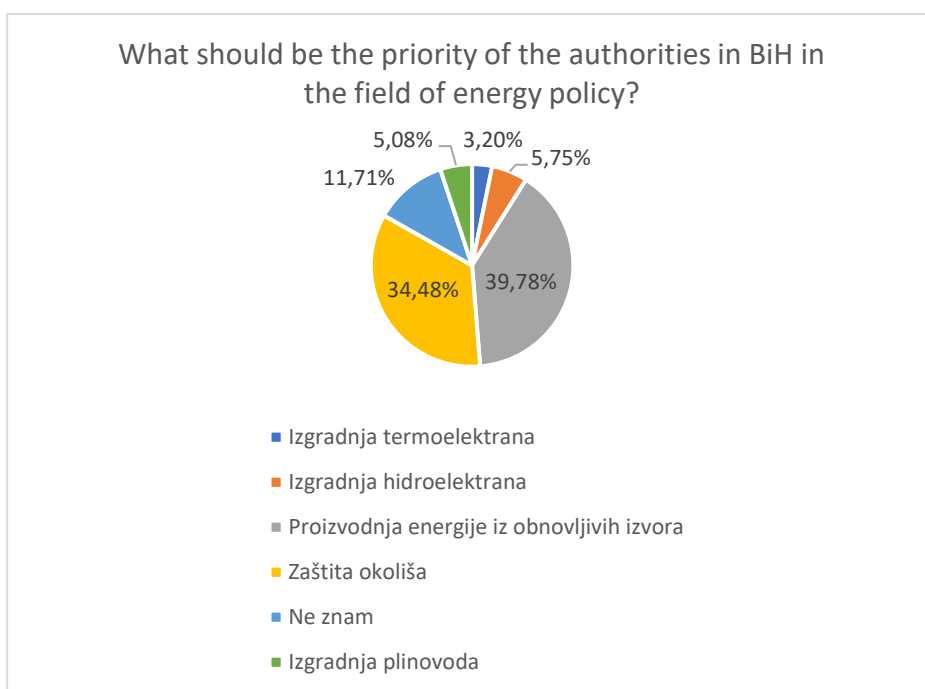


Figure 38 What should be the priority of the authorities in BiH in the field of energy policy?

Regarding this question, there is the highest level of compliance of respondents. Almost four-fifths of all respondents uniformly stated that the priority of BiH in future planning and development of energy policy must be investment in renewable energy sources and at the same time environmental protection. Therefore, the old models of large infrastructure projects in the energy sector are no longer acceptable if they do not have a component of sustainability and environmental protection. This fact is evidenced by numerous civil society organizations that have, through public action, managed to convince the authorities to abandon the planned concept of building small hydropower plants at the expense of the environment. With 39.8% citizens expressed a great tendency of society to base future development on investment in renewable energy plants. The potential of wind and solar energy in BiH has finally been discovered, and citizens have obviously recognized the multiple benefits that such a structure of the energy

sector offers to society. In second place, but with a significantly lower percentage (5.7%) respondents placed the construction of hydroelectric power plants. They are the largest part of the existing sector and there is a tradition of their construction and management, even a certain form of habituation. Given the fact that hydro energy in citizens minds is mostly overlapped and sometimes placed in renewable energy sources, this percentage is perhaps lower because the respondents thought of the hydroelectric plants as the part of renewable energy sources. The next on the list, with a slightly lower percentage (5.1%) is the construction of a gas pipeline. This low percentage is conditioned by a very underdeveloped gas network within BiH and a very small reliance of both citizens and industry on this energy source. It could be assumed that a level of fear is also present due to the already described context of the conflict in Ukraine and the media hysteria that has accumulated around gas as an energy source. The construction of thermal power plants is present but only in a low percentage of respondents (3.2%), mainly related to respondents from the Territory of the Federation of BiH, especially those who incline to spaces with the tradition of mining and existing thermal power plants. It is obvious that a warning from the European energy community regarding the plan for the construction of block 7 of the Tuzla Thermal Power Plant has left a mark on public opinion, and only political actors from the Bosniac part of the Federation of BiH are advocating in affirmative tones for its construction.

Finally, it should be noted that no statistically significant association ($r=.031$; $p>0.05$) was found between the entity in which the survey participants live and what should be a priority in energy policy.

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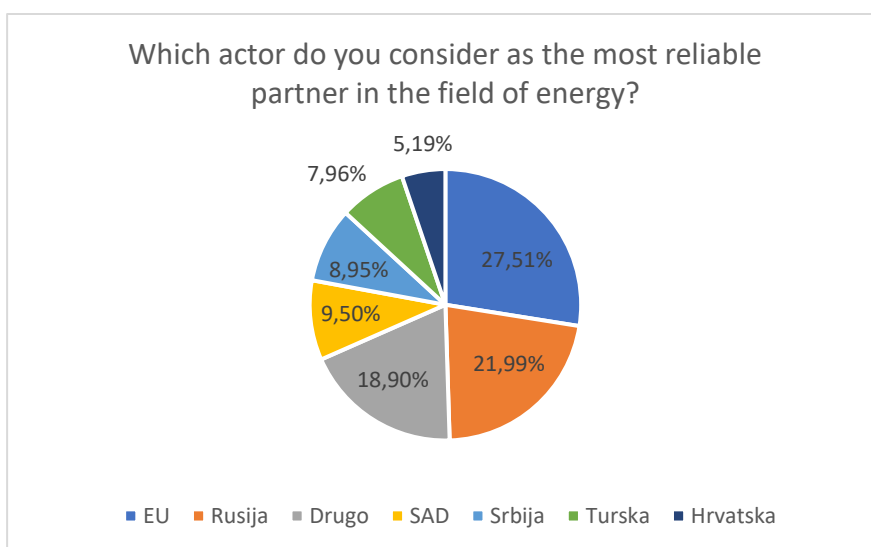


Figure 39 Which actor do you consider as the most reliable partner in the field of energy?

Similar to Figure 37, the logic of the result lies on the same premises. The bloc's (dis)trust in the same actors, this time in different roles, is reflected in almost identical percentages. Thus, respondents consider the Western bloc as the most reliable partner in energy policy, however, this time the EU (27.5%) takes the lead over the US (9.5%). Cumulatively, this percentage roughly reflects the percentage from chart 10 (35.2%) of those who consider Russia as the greatest threat. Therefore, it can be concluded that those respondents who consider Russia as the greatest threat, at the same time consider EU, with the support of the US, as the most reliable partner. *Vice versa*, respondents who consider the EU and US as the greatest threat simultaneously consider Russia as the most important partner (22%).

A somewhat lower percentage can be explained by a lower number of respondents from the RS. A statistically significant association between the entity in which the survey participants live and the actor they consider the most reliable partner in the field of energy ($r=.346$, $p<0.01$) has been proven again, which certainly supports the above-mentioned thesis. As for the data on the relationship with Croatia and Serbia, the ratios are similar to the data

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from chart 10, so Serbia is considered the most reliable partner by 9% of respondents, and Croatia only by 5.2%. Smaller percentages can be explained because the respondents had the possibility of multiple choices and mostly opted for large geopolitical actors. On the other hand, the lower percentage for Croatia also reflects that only respondents from Federation living in Croat areas chose this option, while respondents from Bosniac areas opted for some other actors. This is evidenced by the 8% of respondents who pointed out Turkey as the most reliable partner in the energy sector.

Unlike the chart 10 data, there are some differences. For example, neutral response Other was chosen by a significant 18.9% of respondents versus 9.8% who chose the same response when choosing the biggest threat. This large percentage is the result of either ignorance regarding the issues of the energy sector from a geopolitical perspective, or simply an inability to respond to such a complex question with a reduced answer, i.e. one state as the most reliable partner.

To summarize, it is possible to conclude that these results reflect the internal complexity of BiH, both political and media-narrative. The people of BiH are constantly influenced by the orientations coming from these two segments, and energy policy has become an important part of the public debate, especially after the beginning of the war in Ukraine. Each of these dimensions has multiple orientations, and citizens have very much shaped their own attitudes under the influence of the mentioned, which is ultimately proven by correlations from the charts. After all, this plurality, although an aggravating circumstance in today's epoch, in times of relative peace and stability can become a great force and foundation for energy diversification of BiH as a significant impetus for future development.

6.3 *Perception of challenges and potential solutions to the energy situation in BiH*

The conducted research has revealed that attitudes about climate change and energy transition are generally driven by certain factors, such as sociodemographic factors, people's core values and beliefs, perceptions about climate change and the energy industry, and the impact of mass media on public opinion. It is difficult to make a final judgment on how all these factors combined together create and shape public opinion on issues such as the energy transition (Thomas et al., 2022). It is clear that sociodemographic factors as well as people's core values and beliefs have a significant impact on people's attitudes about the energy transition. It is important to note that movements whose main goal is to point out climate change have gained importance in recent years, especially among the younger population in Europe, as shown by the election results of "green" parties in European countries in the last ten years. It can be argued that young people are more focused on the issues of fighting climate change, which is an essential part of the explanation of the sociodemographic factor.

The second factor implies the influence of fundamental values and beliefs, that is, general and enduring principles that individuals adhere to concerning desirable outcomes or lifestyles. In this regard, Thomas and others concluded that those who identify as the political left will be more supportive of the transition than those on the right, given that political parties, interest organizations and elites that support the transition are associated with the political left. The third factor relates to people's perceptions of climate change. Of course, if they believe in anthropogenic climate change and are concerned about it, it is assumed that they will support the energy transition towards renewable sources. If one does not believe that climate change is real, they are unlikely to think that a transition from fossil fuels to more renewable energy sources is needed. Similarly, the more someone is concerned about climate change, the more likely they are to support the energy transition. (Thomas and others, 2022) Finally, the fourth factor is

perhaps the most important one, and that is the influence of mass media on shaping public opinion on the energy transition.

The media is the fundamental means through which most people receive information on important political and social issues, which is why they play an important role in creating public opinion. People depend on information transmitted by the media, and this gives the media "an enormous capacity to shape public opinion." (Iyengar – Kinder, 1987: 2) The way of reporting on an issue affects the opinion of the population on the issue, they can make a topic extremely important or, on the other hand, completely marginal. It could be concluded that audiences with poor knowledge of a particular situation rely more on the media portrayal of that situation, which is visible in reporting on, for example, foreign policy or macroeconomic issues. The way the media report on an event can affect the reader's understanding and perception of that event, i.e. "news recipients build their opinions based on a media and personal thinking framework." (Scheufele, 1999: 107) Simply explained, positioning a story into a negative or positive context affects public opinion.

Two issues were discussed in the context of the public's position on the use of energetics for political purposes. The graph shows the opinions of respondents about energy as a tool for expanding the political influence of external actors, and on the idea that EU environmental standards are actually a way of increasing BiH's dependence on energy sources of neighbouring countries.

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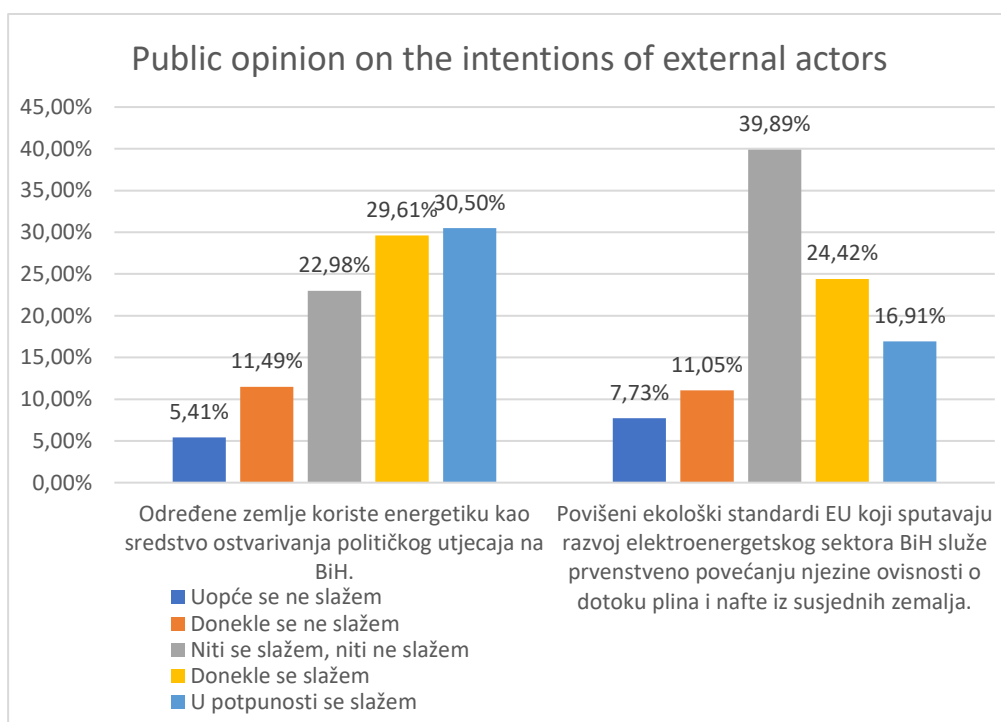


Figure 40 Public opinion on the intentions of external actors

Six out of ten respondents (60.11%) somewhat or completely agree with the claim that certain countries use energy as a means of exercising political influence over BiH. Only 5.41% completely reject such a claim. In response to this question, the distrust of the population in BiH towards external state actors is clearly manifested. There are several elements that can explain the distrust of the population towards the interference of other states. For a long time, the political system of BiH has had difficulties in functioning, for which external actors are often accused, while border disputes with neighbouring countries and ethnic tensions within the state are also factors that affect the perception of other actors. Basically, it is not difficult to understand the scepticism of respondents regarding the intentions of other countries, considering both historical developments and the current situation in BiH.

The chart also shows the attitude of respondents towards the promotion of environmental standards by the EU, where it is evident that 41.33% of

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respondents believe that higher environmental standards of the EU that hinder the development of the electricity sector of BiH serve primarily to increase its dependence on the flow of gas and oil from neighbouring countries, while 18.78% of respondents disagree with this statement. There is a certain distrust towards the EU, but it is also evident that almost 40% of respondents do not have an opinion on this issue. It is interesting to note that there is a greater concern about the use of energy as a means of political influence of certain countries on BiH, than about the potential harmful impact of higher environmental standards promoted by the EU.

Using the t-test for independent samples, differences were found with regard to gender and place of residence in BiH with certain claims. For example, women agree more than men that certain countries use energy as a means of exercising political influence on BiH, while men agree more than women that elevated EU environmental standards that hinder the development of BiH's energy sector serve primarily to increase its dependence on gas and oil supplies from neighbouring countries. Also, survey participants from Republika Srpska agree more than those from the Federation of BiH that certain countries use energy as a means of exercising political influence on BiH.

The survey questions were intended to gain insight into the preferences of respondents about the way in which BiH would most easily and efficiently ensure its energy stability and independence. First, the position on projects that would be launched within BiH without the participation of neighbouring states was questioned, observing the acceptability of the construction of thermal power plants, hydropower plants, mini hydropower plants, and wind and solar power plants in the eyes of respondents. The chart presents the results for thermal power plants, hydropower plants, wind and solar power plants as a separate category, since these are newer types of energy potential exploitation in the country, but also in the region.

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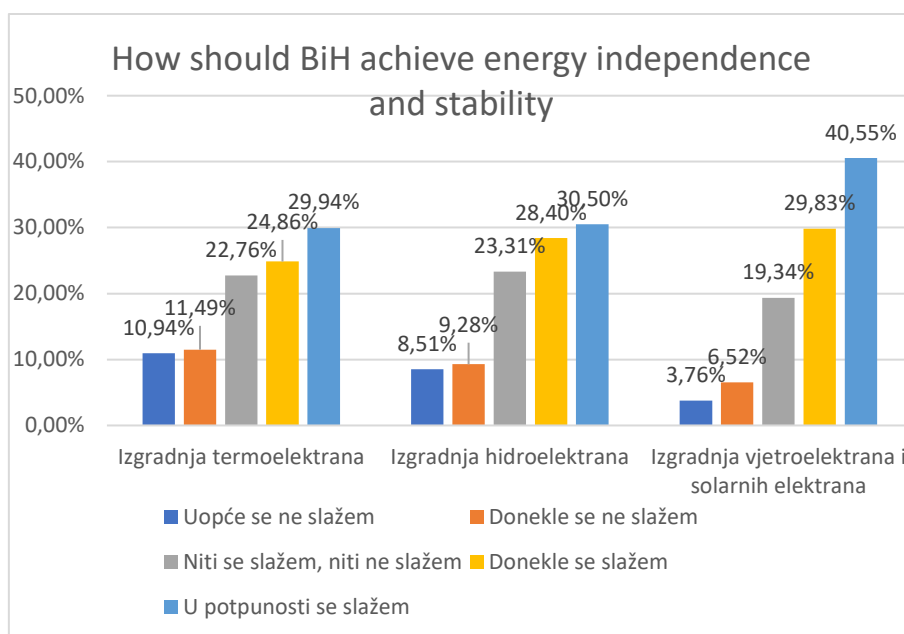


Figure 41 How should BiH achieve energy independence and stability?

The chart shows public attitudes about potential projects that would be completed within the state. The aim was to get an insight into the public opinion on the cost-effectiveness of building new thermal power plants, hydroelectric power plants, wind farms and solar power plants. The results show that respondents mostly agree with the claim that BiH should achieve energy independence and stability primarily by developing its energetic potential, with the best option they see the construction of wind and solar power plants, and as the least attractive construction of new thermal power plants. 70.38% of them believe that the best way is to build solar and wind power plants, 58.90% see hydroelectric power plants as the best solution, and 54.80% consider thermal power plants the best choice. However, it is important to note that all three options are acceptable to the majority of respondents, given that less than a quarter (22.43%) are against the construction of thermal power plants, and only 10.28% disagree that the construction of wind and solar power plants would contribute to energetic stability and independence of BiH. Using the t-test for independent samples,

differences were found with regard to the place of residence in BiH on certain claims. Respondents from the RS agree to a greater extent that BiH should achieve energy independence and stability by developing its energy potential by building thermal power plants and hydropower plants.

Although they were part of the research, mini hydroelectric power plants are not shown in the chart. Interestingly, 31.05% of respondents are against the construction of mini hydropower plants, which can be explained by controversies over certain projects that caused environmental associations to stand against the construction with the argument that it would harm living space. These cases were also exposed to the media, so it is not surprising that a larger number of respondents have negative opinions about the possibility of mass realization of this type of projects. Interestingly, in the study, women were more inclined to express support for this type of projects.

Regardless of the negative opinions towards mini hydropower plants, it seems that citizens are much more open to the option of BiH achieving energy independence by developing thermal power plants, hydropower plants, wind farms and solar power plants, than to achieve the goal of independence by building an oil or gas pipeline that would connect it with neighbouring countries.

From the Figure it is evident that respondents are quite hesitant about the development of oil and gas potential, regardless of whether it is a connection with Serbia or Croatia. The sentiment of respondents towards all four options is relatively uniform, but the least of them agreed with the statement that BiH should achieve energy stability primarily by developing its gas potential and doing so by building a gas pipeline towards Croatia (32.27%), while more respondents were in favour of the construction of an oil pipeline towards Serbia (36.9%). It is important to note that the participants from the Federation of BiH agree more than those from the RS with the claim that BiH should achieve energy stability primarily by developing its gas potential, by building a gas pipeline towards Croatia. The presented results are interesting

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precisely in the context of the dispute over the plans for the construction of gas pipelines that would pass through BiH.

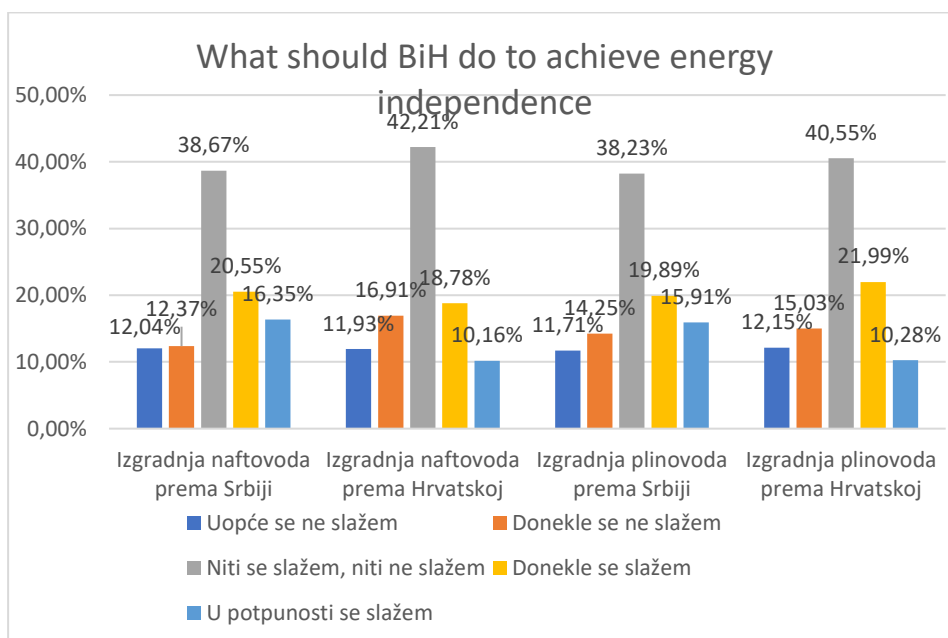


Figure 42 What should BiH do to achieve energy independence

At the end of the study, it was attempted to gain insight into the public's views on crucial issues and dilemmas related to the energy sector, not only in BiH, but also in Europe. More precisely, the issues concerning the perception of the situation in the energy sector of BiH, the forecast of the energy situation in the coming years, and the possible solution for possible problems or energy crises.

The data reveal several public views that are particularly relevant to this study. First, over half of respondents (56.23%) believe that the energy situation in BiH is a concern, while only 15.46% disagree with the statement. Such pessimism can be interpreted as a reaction to global events, especially the war in Ukraine. It is known that when there is a major crisis, especially if the participant in the crisis is a large producer of oil and gas, and that

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participant is imposed with sanctions and export bans, energy prices usually rise rapidly. Such a situation has also affected BiH, where many experts have criticized practically all levels of government for not doing enough to adapt to the new situation and that this will lead to major problems in the energy sector (Al Jazeera, 2023). There was also a thesis in the media that BiH will have to import electricity if infrastructure projects in Tuzla are not completed.

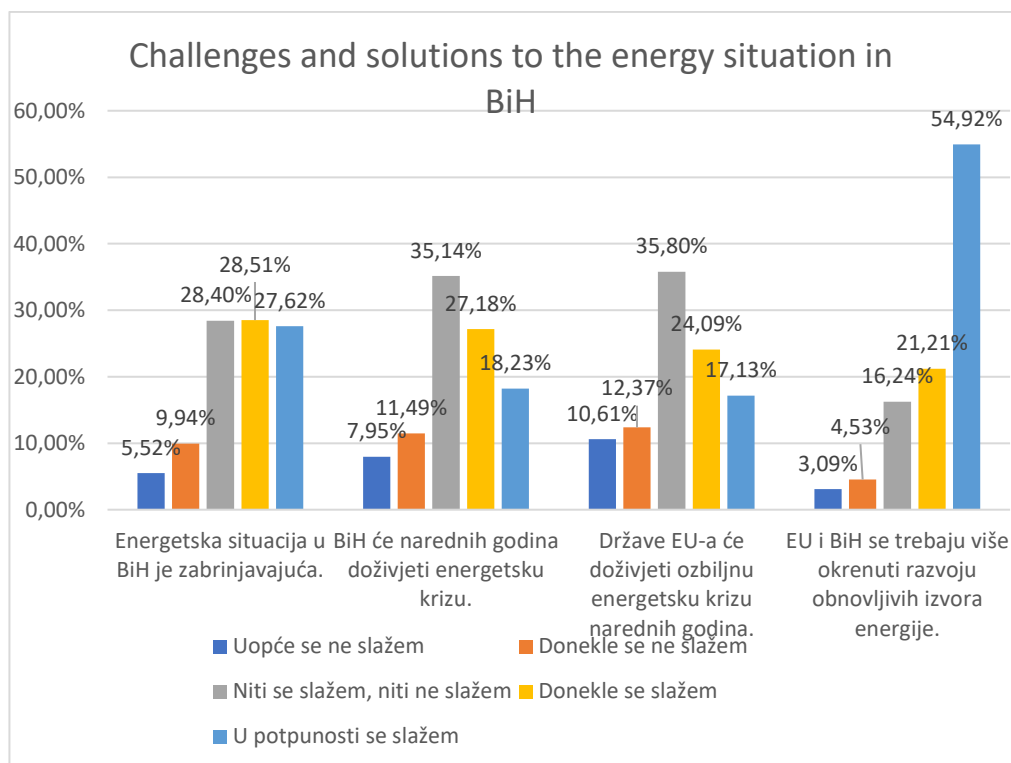


Figure 43 Challenges and solutions to the energy situation in BiH

Next, 45.41% of respondents agree with the prediction that BiH will experience an energy crisis in the coming years. These data are not unusual given that for the past two years the population has been looking at the dark images of the energy situation in Europe. The media presentation of the situation in the energy sector of BiH, among other real problems in this sector,

also contributed to somewhat more pessimistic attitudes of the public about the current situation. Using the t-test for independent samples, differences were found with regard to the sex of the examinees. It has been shown that women are more pessimistic, so not only do they believe that the energy situation in BiH is worrying to a greater extent than men, but also that BiH will experience an energy crisis in the coming years. However, it is worth noting that a lower number of respondents think that the energy crisis is coming to BiH compared to those who believe that the current situation is worrying..

Furthermore, 41.22% of respondents agree with the claim that EU countries will experience a serious energy crisis in the coming years. Of course, such results are expected given the situation with the Russian aggression against Ukraine, the problems in German industry, the sabotage of Nord Stream 2, and the ruined relations with the former main supplier of gas in Europe. More than one-third of respondents have no opinion on this issue, which shows caution in predicting major problems for the energy sector in Europe. Again, it should be considered that the percentage of respondents who predict the energy crisis is not too large if we take into account all the events in the last few years that have posed a huge challenge to the European Union and Europe as a whole.

Finally, an attempt was made to find out what the respondents' position is on renewable sources as a potential solution to accumulated problems in the field of energy. In this case, the results in favour of renewable sources are surprisingly positive. More than three quarters of respondents (76.13%) agree with the claim that the EU and BiH should turn more towards the development of renewable energy sources. Over half (54.92%) fully agree, while only 7.62% of respondents disagreed with this statement. Using the t-test for independent samples, differences were found with regard to the place of residence in BiH on certain claims. For example, RS participants agree more than those from the Federation with the claim that the EU and BiH should turn more towards the development of renewable energy sources. This

question clearly demonstrates the commitment of the public and support for the potential energy transition.

Interestingly, a large percentage of respondents were pessimistic about the energy situation, with a large percentage of those advocating the energy transition by turning to renewable energy sources. Such a correlation is not at all unusual, nor is it noticed for the first time.

Thomas et al. (2022) used a survey of 1.591 respondents conducted in 2019 in the province of Alberta, Canada, to conclude that people generally support the energy transition, both in terms of moving away from fossil fuels and in terms of switching to renewable energy sources. The two strongest predictors of support for the energy transition were pessimistic assessments of the future sustainability of the oil and gas industry and a high level of climate change concern. And in the case of BiH, we have a certain dose of pessimism about the energy future of BiH and the EU, as well as advocating for the energy transition.

For this research, it is important to take into account the mood of Europe's population towards the energy transition, and the latest available data suggest that the European public continues to support a strong shift towards the development of renewable energy sources.

A public opinion poll conducted in June 2023 shows that EU citizens continue to largely support the energy transition and expect large investments in renewable energy. 85% of surveyed EU citizens said the EU should invest massively in renewable energy sources, such as wind and solar energy. Half of those surveyed completely agree with the statement that it is necessary to initiate large investments in the construction of wind and solar power plants, while a little more than a third (35%) somewhat agree. Also, data shows that 82% of respondents believe that the European Union will become less dependent on energy producers outside the EU with the increase in energetic efficiency of buildings, transport and goods, while 80% of respondents believe that EU member states should jointly buy energy from other countries in

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order to get a better price. In addition, 81% of respondents agree that reducing oil and gas imports and investing in renewable energy sources is important for the overall security situation of the European Union. (European Commission, 2023) We mentioned factors that influence public attitudes about the energy transition such as sociodemographic factors, fundamental values and principles, perceptions about climate change, and media presentation of energy issues. All these factors certainly have an impact on the public's attitude on energy issues in BiH.

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