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Modern changes in pellet manufacturing industry in Bosnia and Herzegovina

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ABSTRACT

Key words:

location factor, modern industry,
pellet, economy, Bosnia and
Herzegovina

This paper analyses changes in the modern industrialized pellet manufacturing in Bosnia and Herzegovina, transition of industrial manufacturing, changes in industrial enterprises and changes in industrial branches. Very important changes, closely connected with the introduction of technical- technological innovations and occurrences of new industrial pellet products, have been made in the industrial structure of Bosnia and Herzegovina. Pellet manufacturing from renewable sources of wood energy is ensured for the future as well. Pellet is manufactured from quality dry sawdust, from local resources, our forests, and it is manufactured in Bosnia and Herzegovina. Manufacturing pellet in such way ensures a constant price stability. Under pressure, sawdust turns into bio-fuel which gives of clean and highly efficient thermal energy during burning. Through technological process of pellet manufacturing, raw materials are dried which maximally decreases moisture, and this ensures excellent burning and high energy value. The environmental impact of pellet is minimized because the normal amount of carbon dioxide emitted into the atmosphere is not increased.

Introduction

Using pellet as, fuel for household furnaces, small building boilers or regional heating systems, as well as for, thermal power plants, is an amazing success story in Bosnia and Herzegovina in the past 10 years. (Nurković, R. 2010) Pellet, as fuel from wood remainders, was created in the late seventies of the twentieth century in the USA, and today, it has become the most advanced and the most used biomass fuel. (Hohenstein. W. and Wright L. L. (1994) Wood pellet is easy to transport, it has a high energy value, it has competitive prices in comparison to fossil fuels, it is easy to use due to its significant level of automatization, it has a possibility to precisely define quality parameters, it efficiently burns and it is produced mainly from the wood industry waste. Pellet market is constantly growing, both on European and domestic markets. The European pellet market is currently valued at over 21 million tons (AEBIOM Statistical Report 2017). Bosnian and Herzegovinian capacities for pellet manufacturing are between 400 and 500 thousand tons (AEBIOM Statistical Report 2017), and they are able to satisfy the rapidly growing domestic market, and also realize export which keeps growing in the past several years. Still, domestic pellet manufacturers, despite the quality raw materials used, are not achieving the highest level of quality which has become primary for the export to the European Union. Development of the pellet market in the European Union is caused by the series of natural and socio-geographic factors, and it has caused a series of interesting economic implications. Studies on economic growth in Bosnia and Herzegovina are most often used for evaluation of local, regional and national implications for conduction of certain development decisions. (Ivanović G. 2017)

Social implications, which arise from the local pellet manufacturing from any area in Bosnia and Herzegovina that produce energy from biomass, may be classified into two categories: those that relate to increase of life standard and those that contribute to the increase of social cohesion and stability. (McKendry. P. 2002) In the economic sense, life standard relates to the level of consumption in households or to the level of income. Other factors influence well-being of people, and they do not usually have direct economic value. The analysis also includes factors such as education, healthcare and environment. Introducing employment in pellet manufacturing and source of realized income, such as the energy production from biomass, could help to stop the undesirable social trends (high unemployment levels, depopulation of rural areas, and such). Rural areas in Bosnia and Herzegovina suffer from a significant level of external migration that negatively impacts the stability of population. Considering natural resources and the tradition of using biomass energy in rural areas of Bosnia and Herzegovina, starting a pellet manufacturing plant may have positive effects on rural labor markets, especially through direct employment, but also through support of related industries and employment in those. (Nurković, R. 2014)

Through ensuring energy supply based on personal sources, exposure to the international change in fuel prices is minimized which in turn decreases the risk of the increase of production and transport costs. (Nurković, R. 2012a) The issue of security of the power supply has become very important in the European countries in the past several years. Increased use of pellet in Bosnia and Herzegovina, which is present in a wide geographical sense, could ensure a long-term access to supplies of power at relatively consistent costs in the future. It is important to consider that increased use of pellet to produce energy and the adequate increase in demand for pellet may impact

the temporary deficiency in pellet supply in the periods of high demand. (Moran. J. C.. Granada E.. Portciro J.. and Miguez J. L. 2004)

Methods and data sources

The methodological approach imperatively fits the purpose of the paper, that is, the modern investments in the development of Bosnia and Herzegovina. Studies on economic growth in Bosnia and Herzegovina cover local and regional areas. Through collection of data for the purposes of the article on commercial use of wood mass in Bosnia and Herzegovina, as a resource for recovery and economic growth, several different methods were used: quantitative field research through questionnaires including 24 companies from the wood processing sector in Bosnia and Herzegovina, then qualitative field research using the interview method on a sample of 9 companies from the wood processing sector in the central Bosnia, and analysis of the secondary sources of information. In addition, interviews were conducted with various institutions whose operative activities are closely related to the research subject of the article. (Ćosić, B., Stanić, Z., Duić, N.: 2011) Collection of the secondary data was conducted on the basis of reports of the Chamber of Commerce of Bosnia and Herzegovina, statistical institutes, entrepreneurs associations, forestry administration, international agencies and associations. Additionally, assessment in local municipalities about the industrial manufacturing of pellets was conducted. Namely, based on statistical data, we may clearly determine the direction of certain economic activities and their interests in the pellet manufacturing in Bosnia and Herzegovina.

Wood biomass potentials in Bosnia and Herzegovina

The concept “biological energetics” relates to all types of energy gained from biofuel or the fuel which is gained from biological materials; that is, biomass (FAO, 2004). Biological energetics offers a possibility of decrease in emission of greenhouse gasses per unit of manufactured energy, decrease in dependence on import of energy, and at the same time, way to answer the increase of fossil fuels for the energy supply of the population. (Nurković, R. 2012) Bosnia and Herzegovina is classified in a group of countries that have a high percentage of territory covered in forest resources which implies to a certain potential to manufacture energy based on a sustainable usage of the forest biomass. Bosnia and Herzegovina has 3 231 500 hectares of forests and forest land available, which makes for 63% of the land area of the country. Wood supply of forests in Bosnia and Herzegovina is estimated to about 291 million m³, where 108 million m³ is covered in conifer trees, and 183 million m³ is covered in deciduous trees. The annual volume growth amounts to 7 942 299 m³, where it is 3 123 100 m³ for conifer trees, and 4 819 100 m³ for deciduous trees. A possible annual volume of cutting is 7 235 500 m³, where 2 589 200 m³ is of conifer trees, and 4 646 300 m³ is for deciduous trees, which is 706 700 m³ less than the annual volume growth. The main types of trees are fir, spruce, white and dark pine, beech, various types of oak, and in a somewhat lower number, there are various types of noble deciduous trees such as maple, elm, ash, and fruit trees (cherry, apple, pear). The average consumption of firewood in Bosnia and Herzegovina households is approximately 7.7 m³ annually. Firewood consumption in rural and semi-urban areas is greater by approximately 15% in comparison to the consumption in urban areas (Agency for statistics of Bosnia and Herzegovina 2018).

Forest usage in Bosnia and Herzegovina has gone through certain developmental stages. Through this development of forest exploitation in Bosnia and Herzegovina, it has been a long way

from simple merchandise manufacturing and satisfying the needs of natural manufacturing, all the way to the capitalist way of merchandise manufacturing, and then, the industrial processing of wood. (Nurković, R., (2018) The volume, the way of using it, and the economic importance of forest products have reflected in the relationship between people and forests, and in the measures to care and protects forests as an exploitation objects (Musić J., 2013). Strategic documents of Bosnia and Herzegovina emphasize that the biomass from forests, as well as the remains from the wood processing industry, represent a significant potential for the production of energy. In the Strategic plan and programme of development of the energy sector in Bosnia and Herzegovina, it states that currently there are only a few larger wood processing industrial enterprises who have a cogenerative plants for biomass to produce energy and which are currently in the function of pellets production. Biomass share (mostly from wood and wood remains) in the final energy consumption amounts to 9% at Bosnian and Herzegovinian level in 2018. (Ivanović G., 2017) Firewood is still extremely important in rural areas and smaller municipalities where centralized heating system is still not installed. In these areas, more than 60% of households use firewood as a way of heating (Arnautović., 2013). An important question, that many authors and organizations are trying to answer, considering the current level of manufacturing in forestry, in government and private forests, is that the currently available wood biomass for energy production in Bosnia and Herzegovina is 2.3 million tons annually (Table 1 and Figure 1).

Table1. Available quantities of wood biomass for energy production, 2018.

Source: UNDP (2018): *Potentials of using biomass from forestry and wood industry in Bosnia and Herzegovina (rough draft of the study).*

Types of wood biomass for energy production	Conifer forests	Deciduous forests	Total
	m ³	m ³	m ³
Woodlogs for energy	1 711	1 228 441	1 230 152
Remains after cutting and production of wood products	342 181	261 154	603 335
Chaff	314 848	401 432	716 280
Remains and waste after production of cut grade and veneer	354 857	200 843	555 700
Stump	314 848	334 527	649 375
Total [m ³ /year]:	1 328 446	2 426 396	3 754 842
Total [t/year]:	557 947	1 747 005	2 304 952
Total [tce]	298 866	840 422	1 139 288
Total [toe]	209 223	588 343	797 567

Currently, forestry sector in Bosnia and Herzegovina is not able to allocate adequate amount of funds from current activities for additional investments to build primary infrastructure of forest roads. All this points to the need to find additional sources of funding with an aim to completely realize planned legitimate cutting. (Domac. Richards K.. and Risovic S. 2005) Realization of the planned volume of cutting would mean quantitative increase of market

supply of forest products made from wood. During the analysis of institutional capacities for sustainable use of forest biomass, it is important not to neglect the capacities of private forest owners for the production of wood biomass, moreover, because the analysis of the quality of forest ecosystems in Bosnia and Herzegovina has shown that private forests are of poorer quality, and therefore very adequate for the production of wood biomass for the energy production needs. In order to collect data about feasibility of private forest owners to produce wood biomass, a research project named “Possibilities for energy production from wood from small forest properties in the region JIE (WESSPROFOR)” has been realized within the project named “Strengthening education capacities for development of forest politics and economics in the region of South-Eastern Europe” – FOPER II, EFI. This research, amongst others, has included forest owners in Bosnia and Herzegovina. The results of the research conducted in Bosnia and Herzegovina show that most (73%) of the surveyed recognize the benefits gained from wood biomass production. In most cases, the surveyed believe that wood biomass production from private forests may contribute to their better use, as well as to ensure economic benefits for the owner.

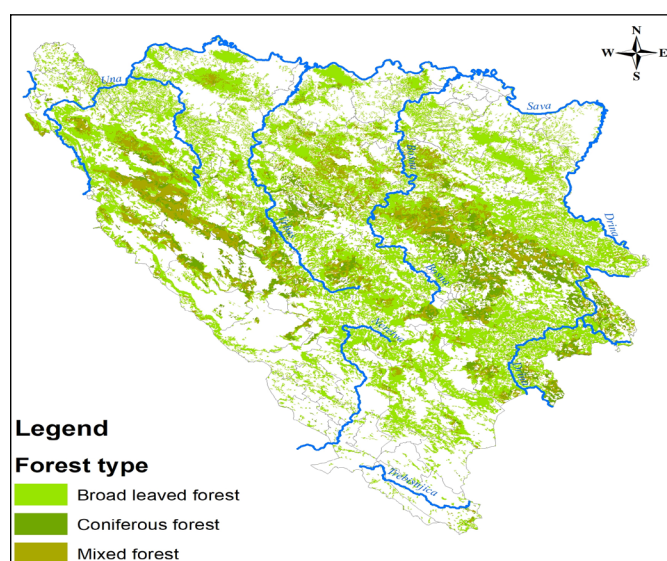


Figure 1. Available quantities of wood biomass in Bosnia and Herzegovina, 2018.

Analysis of pellet manufacturing and pellet markets in Bosnia and Herzegovina

Besides the wood biomass, as a starting raw material for pellet manufacturing for heating, various types of biomass may be used, such as agricultural remains in Bosnia and Herzegovina. (Nurković, R., 2010) Pellets manufactured from agricultural remains have a higher content of ash, however, sometimes it is not necessary to hoarsely grind the raw materials, when they may be directly put into a hammer mill, as it is a case when straw is used as a raw material. Pellet manufacturing will be mostly evened out throughout a year, and the same goes for the demand, which peaks during the heating season. The availability of those materials also varies throughout a year, which means there is a need to store raw materials, as well as the final product. Biomass is stored in open outside warehouses, and it is then transported to central warehouses close to the plant as it is necessary. (Lorber, L., 2010) It is necessary to ensure adequate silos for storing pellet in Bosnia and Herzegovina.

The manufacturing level in the forestry sector depends on a series of market and institutional factors. In order to improve the

production process and to enable a more efficient use of forest resources, it is necessary to invest additionally into the infrastructure, primarily into opening new forest complexes. Pellets were used for the first time in Bosnia and Herzegovina in residential central heating systems in 2008. Approximately 8% of all sold heating boilers were pellet boilers, which means that it is the market leader in the South-East Europe in the number of pellet boilers. This role is the result of more than 20 years of research and development in the area of burning wood chips. Bosnian and Herzegovinian companies are creditable for introducing pellet boilers to the European Union market, as well as to the markets of other European countries. Share of the pellet boilers on the Bosnian and Herzegovinian market could not be compared to any other market. According to the data from the field, demand for products made from wood waste is existent, however, due to the minimum supply, it is not able to be precisely estimated. Increase in the prices of firewood, as a traditional fuel in Bosnia and Herzegovina, and its growingly decreasing availability on the market, will cause a greater demand for products made from wood waste. To replace only 20% of the annual demand for firewood, products made from wood waste, we would need to manufacture briquette and pellet starting at 40,000 tons per year. The current manufacturing of briquette and pellet in Bosnian and Herzegovinian is estimated to 15,000 tons, from which almost 30% is exported. Briquette prices on the Bosnian and Herzegovinian market are from 60 to 90 Euros/t, while the pellet prices, which is almost completely exported, are 100 to 120 Euros/t (named are the wholesale prices, without trading mark-ups). (Table 2, Figure 2, and Figure 3).

Table 2. Pellet manufacturing in Bosnia and Herzegovina, 2012-2018. *Source: The Agency for Statistics of Bosnia and Herzegovina, 2012-2018.*

Year	Production in tons	Price EUR	Export in tones in European Union
2012	8.000	125	2.000
2013	9.000	130	3.000
2014	12.000	135	4.000
2015	15.000	130	3.000
2016	15.000	130	3.000
2017	16.000	135	7.000
2018	16.000	130	7.000

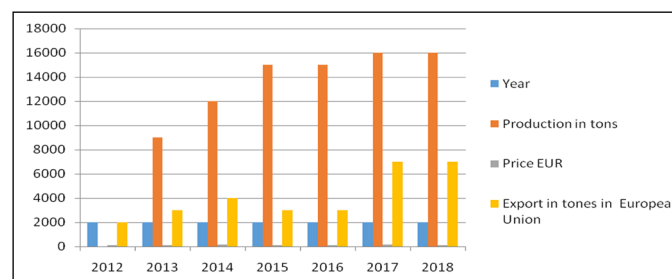


Figure 2. Pellet manufacturing in Bosnia and Herzegovina, 2012-2018.

Currently, there are approximately 25 manufacturers of pellet boilers, and despite the recession, Austrian pellet industry is anticipating positive market growth in 2018 as well. Pellet manufacturing in Bosnia and Herzegovina has started in 2012 with the capacity of 8000 t/year, and it has been continuously growing during the past period, reaching approximately 16,000 tons in 2018. Due to the fast growth of pellet manufacturing capacities, exports of

smaller packages of pellet to Italy and Germany has grown. In 2018, approximately 7000 tons of industrial pellets have been sold in the countries of the European Union. The average price of pellet in 2018 was 20.6 Eurocents/kg, in comparison to 21.7 Eurocents/kg, which was the average price in the long-run for February (since 2017). The rapid change in the demand for pellet increases the competitiveness for sawdust and shavings in the industry of chipboard boards.

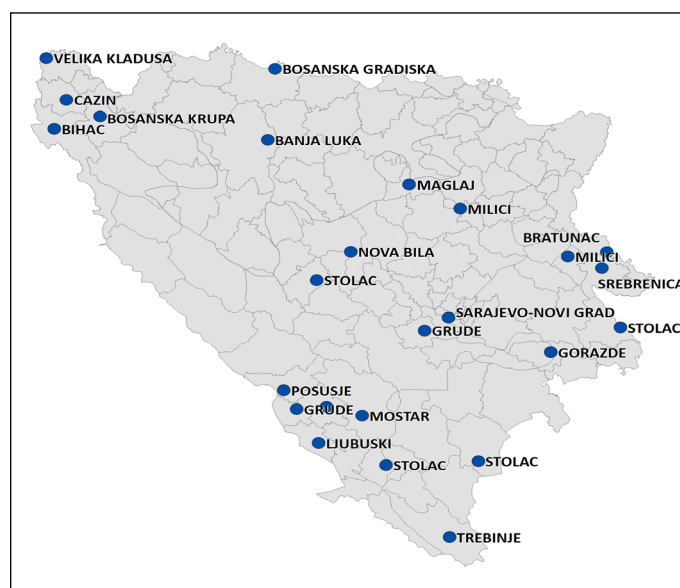


Figure 3. Pellet manufacturing in Bosnia and Herzegovina, 2012-2018.

Pellets are more and more used also in larger boiler rooms of industrial enterprises heating on biomass fuel (installed power > 30 kW) for heating larger residential building, service industries and trading businesses. Pellet boiler manufacturer “KOVAN” in the municipality of Gracanica satisfies international standards on English and European Union markets, as mandatory standards in cases for compensation, and these standards are also seen as a very effective barrier when importing low-quality pellet. It is important to emphasize that positive effects on development of pellet markets in Bosnia and Herzegovina also have impact in several neighboring countries. (Jovanović B., Musić J., Lojo A., 2008) Since there is an adequate supply of high-quality pellets from Bosnia and Herzegovina, there is a possibility to successfully operate with pellet boilers as well, and to expand those operations to England. The scope and the growth speed of the market in Bosnia and Herzegovina point to a very high potential for pellet furnaces, especially when the economic

conditions are favorable. Due to high oil and gas taxes, pellet use in Bosnia and Herzegovina is almost completely competitive. Pellets imported from Bosnia and Herzegovina have an important role in supplying the European Union markets. (Nurković, R., 2012).

The European integration process and internationally signed agreements represent a chance that Bosnia and Herzegovina is included in leading trends in the European Union, and in this way, to get a chance for such reforms that guarantee sustainable development in Bosnia and Herzegovina. (Doleček V., Karabegović I., 2013) In Bosnia and Herzegovina, the main advantage in using biomass and as a renewable energy source hides many potential, not only intentionally planted plant cultures, but also waste materials in agricultural and food industry, as stated above. Using biomass, we may produce gases that could also be used in the production of energy. According to conducted analyses so far, it is familiar that energy is used to produce thermal energy in Bosnia and Herzegovina, especially in rural areas, where it is mostly used to heat households and to cook. This part of the biomass in the form of firewood is used in all cities, besides rural areas, where there is no public heating network. Biomass in the form of firewood has an ascending trend as a source of energy in Bosnia and Herzegovina. Analyses show that the average consumption of this biomass annually is estimated to approximately 1.3 million m³. Based on (Table 3), we conclude that using biomass and its potential from forests and wood industry waste is currently negligible, even though it is approximately estimated to 1.3 million m³ in Bosnia and Herzegovina, since the energy potential with its lower thermal power of 10.28 GJ/t has amounted to only 8,139 TJ/annually. In the past several years, briquette and pellet plants are being built, and therefore, the interest, for using this resource, that is, biomass, is growing. Some studies estimate that there were boilers installed in Bosnia and Herzegovina, with the power of 100 MW.

Conclusion

Prices of raw materials used to produce pellet in Bosnia and Herzegovina are competitive, and there is a significant potential of the biomass from forest remains that is currently unexploited. In the future, it is probable that the market in Bosnia and Herzegovina will grow, especially if fossil fuels continue to follow the trend of becoming more expensive, and this would have a positive effect on the economy of Bosnia and Herzegovina, because its market would become more independent. Wood pellet is a good alternative also for fuels that are used in central heating systems, and there even is a production of boilers and furnaces for central heating systems in Bosnia and Herzegovina. Manufacturing pellet from forest biomass in Bosnia and Herzegovina shows good results in the cost-benefit analysis, and it is surely justified to invest in it. It is also positive

Table 3. Using energy potential of forest biomass and wood industry waste, 2018. Source: The Agency for Statistics of Bosnia and Herzegovina, 2018.

FOREST BIOMASS		Types of forests	Quantity m3/year	Quantity t/year	Lower thermal power GJ/t	Energetic potentials TJ/year
		Deciduous	295,529	212,781	10.28	2,187
		Conifers	202,866	91,290	10.28	938
Wood industry waste	Sawdust	Deciduous	283,300	203,976	10.28	2,097
		Conifers	145,227	65,352	10.28	672
	Steaks	Deciduous	212,425	152,982	10.28	1,573
		Conifers	145,227	65,352	10.28	672
TOTAL			1,284,624	791,733	10.28	8.139

that by opening plants, there would be new jobs opened, and this stimulates development of the economy. Besides that, biomass may be used as a renewable source of energy, and it is familiar that the European Union invests in sustainable development, and it has special funds for renewable sources of energy.

For the same capacity, it is more cost effective to have one plant and manufacture in several shifts, because the transport costs are relatively low, and a smaller investment cost is required as well. A positive aspect of operating in several shifts is that there is a greater possibility for employment. In this way, the internal rate of return is increased with starting conditions, however, it also become more sensitive to the changes of prices of raw materials and final products. This paper showed that it is the most cost effective to produce wood pellets in several shifts and in many macro locations. Also, for using forest remains in one local community, one plant is sufficient and adequate. In Bosnia and Herzegovina, a powerful growth of domestic industry of pellets, with political support, as it is present at the European Union level. An ambitious goal of the European Union to achieve 20% of energy from renewable sources until the end of 2020 is hard to achieve without politics that supports and stimulates the development of renewable energy sources.

References

- Agency for Statistics of Bosnia and Herzegovina, Sarajevo, 2007–2018.
- Domac.Richards K.. and Risovic S. 2005. Socio-economic drivers in implementing bioenergy projects. *Biomass and Bioenergy* 28. 97–106.
- Frank. i. R. and Smith W. H. 1993. Methane from biomass. science and technology:1: Feedstock development. *Biomass* 5, 1–2.
- Hohenstein. W. and Wright L. L. 1994. Biomass energy production in the United States: An overview. *Biomass and Bioenergy* 6(3). 161 – 173.
- McKendry. P. 2002. Energy production from biomass (part 1): Overview of biomass. *Bioresour. Technology* 83. 37–46.
- Moran. J. C., Granada E., Portcero J., and Miguez J. L. 2004. Experimental modeling of a pilot lignocellulosic pellets stove plant. *Bionuiss and Bioenergy* 27. 577–583. Oak Ridge National Laboratory. 2011. The bioenergy cycle: A vision of the future. Factsheet. (<http://bioenergy.ornl.gov/main.aspx>).
- Lorber, L., 2010. New challenges for Sustainable Rural Development in the 21st Century, *Journal for geography*, 5–2, (IGU)Maribor, 6–13.
- Ivanović G. 2017. Pобољшanje kvaliteta peleta u Bosni i Hercegovini kako bi se odgovorilo industrijskim izazovima: novinar hemičara, tehnologa i ekologa Republike Srpske. 13 (2017) 39–45 / Ivanović G. 2017. Quality improvement of Bosnia and Herzegovina pellets to meet industry challenges: Journalist of Chemists, Technologists and Ecologists of Republika Srpska. 13 (2017) 39–45.
- Nurković, R., 2010. Influence of Tertiary Activities on Transformation of the Rural Settlements in Bosnia and Herzegovina, *Revija za geografiju (Journal for geography)* 5–1, 2010. ISSN 1854–665X, UDK 91, Department of Geography, Faculty of Philosophy, University of Maribor, p. 67–75
- Nurković, R. 2012a. Geographic Views on Regional Planning and Development of Bosnia and Herzegovina. 17th International Conference on Urban Planning. Regional Development and Information Society REAL CORP 2012 RE-MIXING THE CITY. (CD-ROM). 1–6. Multiversum Schwechat, 2012. (www.corp.at).
- Nurković, R., 2012. Rural space as a product of contemporary economic-geographic development in Bosnia and Herzegovina, IGC COLOGNE 2012. 32 International Geographical Congress, University of Cologne, Institute of Geography, Germany, p.178–179
- Nurković, R. 2014: Influence of industry on changes in rural settlements on example of the ironworks in municipality of Zenica, *EURORURAL* 14, Brno, Czech Republic, p.25–37.
- Nurkovic, R., (2018): Rural development in Bosnia and Herzegovina under the influence of local communities, *Rev. Roum. Géogr./Rom. Journ. Geogr.*, 62, (2), p.203–216, 2018, București. http://www.rjgeo.ro/latest_issue.html
- Nurković, R., (2010) Influence of tertiary activities on transformation of the rural settlements in Bosnia and Herzegovina, *Journal for geography* 5–1, (IGU)Maribor, 67–73.
- Nurković, R., (2012) Socio-economic transformation of Bosnia and Herzegovina, *Rural Studies* Vol.27 Local and regional development-challenges and policy issues, WARSZAWA 2012, 151–161.
- Čosić, B., Stanić, Z., Duić, N. 2011. Geografska raspodjela ekonomskog potencijala poljoprivredne i šumske biomase preostale za uporabu energije: studija slučaja Hrvatska, energija“ 36.p. 2017–2028. / Čosić, B., Stanić, Z., Duić, N. 2011. Geographic distribution of economic potential of agricultural and forest biomass residual for energy use: Case study Croatia, *Energ.* 36.p. 2017–2028.
- Jovanović B., Musić J., Lojo A., 2008: Energetski potencijal drvne biomase u BiH, Konferencija „Šumska nauka između zahtjeva ekonomije i društva“ Sarajevo, 2008 / Energy Potential of Wood Biomass in BH. Conference "Forest Science between Economy and Society Requirements", Sarajevo, 2008
- Doleček V., Karabegović I., 2013: Renewable Energy Sources BH - State and Perspectives, Academy of Montenegro, Podgorica, 2013. / Doleček V., Karabegović I. 2013. Obnovljivi izvori energije BiH - država i perspektive. Akademija Crne Gore, Podgorica 2013.

Data sources

- FIPA - Agency for promotion of foreign investments in Bosnia and Herzegovina, 2011, URL: http://www.fipa.gov.ba/local_v2/default_bs.asp (25.01.2011).
- http://en.volksbank.com/investor_relations/group_information/ownership_structure (14.01.2013).
- <http://www.telekom.rs/Contents/ContentDefault.aspx?temp=0&sid=1253&id=1254> (14.01.2013).
- <http://www.fipa.gov.ba> (2014)
- <http://www.ziraatbosnia.ba/turkish/text.php?tekst=16> (14.01.2013). (Foreign trade chamber of Bosnia and Herzegovina (EFTA, the EU, others 2010–2014)
- Overview of registered FDI in BH by countries and companies from May 1994 to June, 30 2010. (Companies with capital over 1 mil. KM) Ministry of Foreign Trade and Economic Affairs of Bosnia and Herzegovina, Sarajevo, 2010.
- Law on Foreign Direct Investment in Bosnia and Herzegovina, Ministry of Foreign Trade and Economic Affairs of Bosnia and Herzegovina, Sarajevo, in 1998.

Abbreviations

- BH - Bosnia and Herzegovina
 EU - European Union
 FBiH - Federation of Bosnia and Herzegovina
 FDI - foreign direct investment
 KM - Convertible mark
 IMF - International Monetary Fund
 RS - Republic of Serbian
 UNCTAD - United Nations Conference on Trade and Development
 WTO - World Trade Organisation